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THE HAWORTH SERIES OF ARITHMETICS

NUMBER FOUNDATIONS

BY

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FOR BOYS, NEW YORK

AND (AS CRITICAL ADVISER)

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NEW YORK
NEWSON AND COMPANY, PUBLISHERS
1905

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PREFACE

"NUMBER FOUNDATIONS" is the first of a series of three books, covering a six years' course of study in arithmetic.

The series, based on sound psychological principles, is the outcome of long experience in teaching and supervision, and contains all the arithmetic which the average experience in life requires.

The method of presentation is closely inductive, and the true pedagogical order, first clear ideas, then clear expression, has been followed throughout.

The examples have all been selected within the range of the pupil's comprehension, and the lessons have been graded with reference to the average pupil's capacity for work. The manner in which this grading has been done makes it possible for a pupil in six years to cover with thoroughness, ease, and interest, the ground which, under other conditions, often requires from seven to eight years.

The optional exercises given in "Number Foundations" can be omitted without narrowing the scope of the work. They are inserted to give additional practice and to provide exercise for the inventive faculty.

The problems have been selected for the teaching of arithmetic and not for the purpose of teaching commerce, farming, stock-raising, or mining. They are drawn from commercial as well as industrial sources, and much attention has been given to stating them with simplicity and clearness. While it is desirable to draw upon familiar occupations for problems, it is not true economy of the pupil's time to make an arithmetic a cyclopedia of useful information.

The early introduction of algebraic symbols and geometric forms, in terms which even the dullest pupil can comprehend and apply, will appeal to the intelligent teacher as a progressive and interesting factor in mathematical development. No work of this nature has been introduced which has not first been fully tested in the class-room and found to be within easy reach of the pupil's range of execution.

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NUMBER FOUNDATIONS

NUMBER FOUNDATIONS

I. — ONE, TWO

1. Hold up your right thumb.
2. Hold up your left thumb.
3. How many thumbs have you?
4. Touch your right ear.
5. Touch your left ear.
6. How many ears have you?
7. How many ones in ⁚ ?
8. How many twos in ⁚⁚ ?
9. How many gloves in a pair of gloves?

10. How many rabbits in a pair of rabbits?

11. This (⁚) is two. Make a pair of twos (*see* question 8).

NOTE. — For further practice require pupils to bow to the right, bow to the left; look to the right, look to the left; face to the right, face to the left; raise the right hand, raise the left hand.

II. — ONE HALF

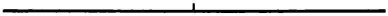
Use one-foot rules

1. Draw a straight line and place a point in the middle.

2. How many parts have you made? If the point is exactly in the middle, the parts are called halves.

3. Divide an apple between John and James, giving one as much as the other. What part does each receive?

4. Divide a piece of paper into halves. How many halves do you make?

5.  This line is two inches long. One half of it is —— inch long.

6. One half of two inches is —— inch.

7. One inch and one inch are —— inches.

8. One half of two cents is —— cent.

9. One cent and one cent are —— cents.

10. Write the figures 1, 2 five times, or until you can write them well.

OPTIONAL

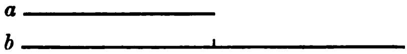
1. Draw a line 1 inch long.
2. Draw a line 2 inches long.
3. Place a point in the middle of the two-inch line

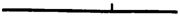
4. How long is each part?
5. Place a point in the middle of the one-inch line.
6. How long is each part?
7. Tell a story of two little girls and an orange.

NOTE. — A serviceable rule may be made by once folding a piece of note paper and marking it into inches.

III. — ONE HALF

Use one-foot rules



1. Which line is the longer?
2. Measure line *b* by line *a*, using a string, a piece of paper, or a foot rule.
3. How many *a*'s are as long as *b*?
4. *a* is equal to what part of *b*?
5. Try to draw a line as long as *b*.
6. Divide it into halves.
7. How many halves?
8. Is this line divided into halves? 
9. Why?
10. Write $\frac{1}{2}$, $\frac{2}{2}$ five times neatly, or until you can write them well.

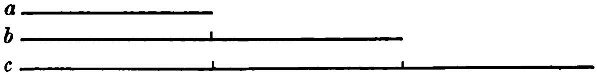
OPTIONAL

1. Draw a straight line.
2. Draw a straight line twice as long.

3. Draw a straight line one half as long.
4. Cut a strip of paper as long as your first line.
5. Cut a strip of paper twice as long.
6. Tell a story about halves of a stick of candy.
7. Tell a story about halves of a small pie.
8. Tell another story about halves.

IV. — THREE, ONE THIRD

Use one-foot rules



1. Which of these lines is the longest?
2. Which is the shortest?
3. How many *a*'s are equal to *b*?
4. How many *a*'s are equal to *c*?
5. *a* is equal to what part of *b*?
6. *c* is equal to how many *a*'s? *a* is equal to one-third of *c*.
7. *c* is divided into —— equal parts.
8. Each part is —— —— of *c*.
9. Two cents and one cent are —— cents.
10. One cent and one cent and one cent are —— cents.
11. Write figure 3 five times neatly, or until you can write it well.

OPTIONAL

1. With a rule draw a line as long as line *c*.

2. Cut a strip of paper as long as line *a*.

3. With this piece of paper mark your line into three equal parts.

4. Line *a* is equal to what part of your line?

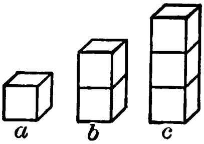
5. Can you make a stool stand on two legs?

6. How many marbles at least must you place under your book, before it will stand alone?

7. Tell a story about thirds of an orange and three little girls.

8. Tell a story about thirds of an apple and three little boys.

V. — ONE HALF, ONE THIRD



1. Look at blocks *a*, *b*, and *c*. Close your eyes and think of them.

2. Which is at the left?

3. Which is at the right?

4. Which is the smallest?

5. How many *a*'s are equal to *b*?

6. How many *a*'s are equal to *c*?

7. *a* is equal to what part of *b*?

8. *a* is equal to what part of *c*?

9. *a* and *b* together are equal to how many *a*'s?

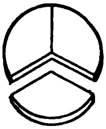
10. *a* is equal to ——— ——— of *b*.

SUGGESTION. — Inch cubes arranged as above will add to the interest.

11. *a* is equal to —— —— of *c*.

12. Write $\frac{1}{3}$ five times neatly, or until you can write it well.

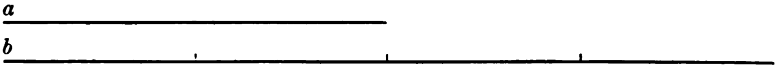
OPTIONAL



1. The piece cut out is —— —— of the whole.
2. If each boy took one third of the whole, the whole would be enough for —— boys.
3. One third of three cents is —— ——.
4. One third of three apples is —— ——.

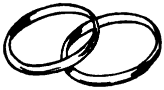
5. Tell a story about three little boys and a peach.
6. Tell a story about three little girls and an orange.
7. Tell any story about thirds.

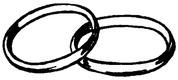
VI.—FOUR



1. Using line *a* as a measure find how many *a*'s are equal to *b*.

2. Line *a* is two inches long and line *b* is four inches long; how many twos in four?



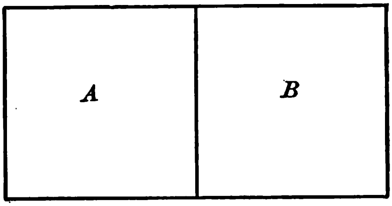


3. How many bracelets in a pair of bracelets?

4. In two pairs of bracelets there are —— bracelets.

5. Line *b* is equal to —— *a*'s.

6. Line *a* is equal —— —— of *b*.



7. This rectangle is —— inch wide and —— inches long.

8. It is divided into —— equal parts.

9. *A* is —— —— of the rectangle.

10. *B* is also —— —— of the rectangle.

11. The —— halves make the whole rectangle.

SUGGESTION. — The pupil should make the lines and rectangle with a foot rule.

OPTIONAL

1. How many shoes do you wear at a time?
2. How many pairs of shoes do two persons wear at a time?
3. Two pairs of shoes are —— shoes.
4. How many arms have you?
5. How many arms have two persons?
6. How many ears have two persons?
7. How many pairs of eyes have two persons?
8. Two pairs of eyes are —— eyes.

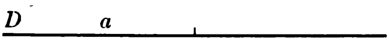
9. Tell a story about four things that are on one of your hands.

10. Tell a story about two things that every person has.

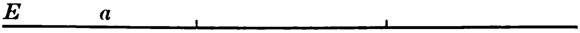
11. How must two roads come together to point four ways.

VII.—FOUR, ONE FOURTH

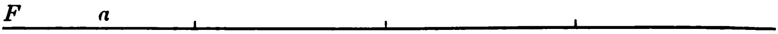
Let the pupil draw these lines, using a foot rule



1. *a* is what part of the whole line *D*?
2. The whole line is equal to —— *a*'s.



3. *a* is what part of the whole line *E*?
4. The whole line is equal to —— *a*'s.



5. *a* is what part of the whole line *F*?
6. The whole line is equal to —— *a*'s.
7. How many *D*'s are equal to *F*?
8. *D* is equal to what part of *F*?
9. *E* is equal to the whole of *D* and what part of *D* beside?
10. Write the figure 4 five times neatly, or until you can write it well.

11. One fourth of four cents is —— cent.

OPTIONAL

1. One half of four marbles is —— marbles.

2. If I give two cents to John and two cents to Jane, they will have —— cents.

3. Cut a piece of paper four inches long and mark it into four equal parts. Each part is —— inch long.

4. Draw a figure[1] with three straight lines (triangle).

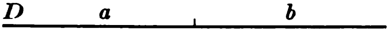
5. Draw a figure with four straight lines.

6. Draw a line across the second figure so as to make two figures like the first.

7. Now you have made —— triangles in all.

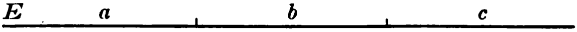
VIII. — TWO THIRDS, THREE FOURTHS

Let the pupils draw these lines, using a foot rule



1. *a* is —— —— of *D*.

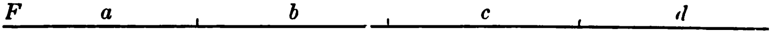
2. *a* and *b* are —— —— of *D*.



3. *a* is —— —— of *E*.

4. *a* and *b* are —— —— of *E*.

5. *a*, *b*, and *c* are —— —— of *E*.



6. *a* is —— —— of *F*.

7. *a* and *b* are —— —— of *F* ($\frac{1}{2}$).

[1] The teacher should show the meaning of "figure."

8. Also, *a* and *b* are —— —— of *F* ($\frac{2}{4}$).

9. *a*, *b*, and *c* are —— —— of *F*.

10. *a*, *b*, *c*, and *d* are —— —— of *F*.

NOTE. — $\frac{2}{3}$, two thirds; $\frac{2}{4}$, two fourths; $\frac{3}{4}$, three fourths.

OPTIONAL

1. Cut a piece of paper two inches long and mark it into halves.

2. Cut a piece of paper three inches long and mark it into thirds.

3. Mark a piece of paper into halves; then continue the marking so as to make quarters (fourths).

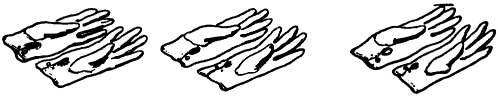
4. Each half equals —— quarters.

5. Make a story about two little girls and halves.

6. Make a story about three little boys and thirds.

7. Make a story about four little mice, a piece of cheese, and fourths.

IX. — FIVE, SIX



1. How many pairs of gloves in the picture?

2. How many gloves in all?

3. 3 twos are ——.

4. How many twos in : : ?

5. How many twos in : : : ?

6. How many threes in ⁚ ⁚ ⁚ ?
7. How many ones in ⁚ • ⁚ ?
8. There are —— twos in ⁚ ⁚ .
9. There are —— twos in ⁚ ⁚ ⁚ .
10. There are —— threes in ⁚ ⁚ ⁚ .
11. Write the figure 5 five times, or until you can write it well.

OPTIONAL

1. Three dogs have —— ears.
2. Two cows have —— horns.
3. Draw a line 2 inches long.
4. Draw another line 3 times as long.

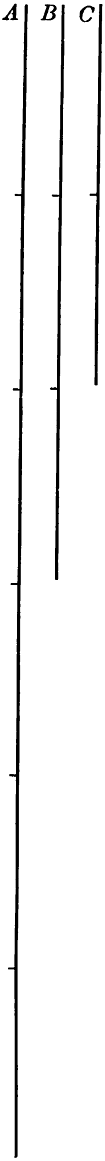
5. Tell a story about 3 kittens, using the number six.

6. Tell a story about two eyes, using the number six.

7. Tell a story about four knives and one knife, using the number five.

X. — SIX

Let the pupil draw these lines, using a foot rule



1. Line *A* is six inches long; how long is *B*?

2. How long is *C*?

3. How many 3-inch lines are equal to the six-inch line?

4. How many 2-inch lines are equal to the six-inch line?

5. 3 inches are equal to —— —— of six inches.

6. 2 inches are equal to —— —— of six inches.

7. $\frac{1}{2}$ of six inches is —— inches.

8. $\frac{1}{3}$ of six inches is —— inches.

9. 2 inches and 2 inches and 2 inches are —— inches.

10. 3 inches and 3 inches are —— inches.

OPTIONAL

1. Cut a strip of paper six inches long.
2. Cut a strip of paper two inches long.
3. How many 2-inch strips will measure the six-inch strip?
4. Cut the six-inch strip in the middle.
5. How long is each half?

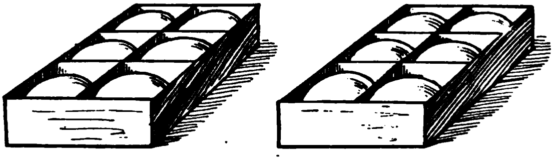
6. Tell a story containing 3 roses, 2 roses and the number five.

7. Tell a story about a man who began with six dollars and ended with five dollars.

8. Tell a story about some two-cent stamps and three letters.

9. Tell a story about six cents given to three little boys.

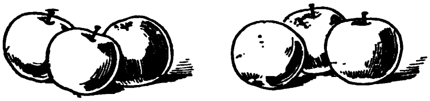
XI. — TWELVE



1. How many groups in the picture?

2. How many eggs in each group? In all there are a dozen, or twelve, eggs.

3. What part of a dozen in each group?



4. How many groups of apples in the picture?

5. How many apples in all?

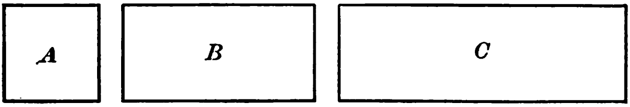
6. How many in each group?

7. How many threes in six?

8. Each group of apples is what part of all the apples?

9. One half of a dozen is ——.

10. One half of six is ——.



11. How many *A*'s are equal to *B*?

12. How many *A*'s are equal to *C*?

13. How many *B*'s are equal to *C*?

OPTIONAL

1 Two boys together have half a dozen pencils. One has as many as the other. How many has each ?

2. Place a dozen nuts in two equal groups. There will be —— nuts in each group.

3. Place a dozen pencils in three equal groups. There will be —— pencils in each group.

4. One third of a dozen is ——.

5. Tell a story about a dozen lemons.

6. Tell a story about three little girls who had twelve dolls.

XII. — ONE HALF, ONE THIRD, SIX

1. Jane had 2 cents and her mother gave her one more. How many had she then ?

2. A boy having one peach bought two more. How many had he then ?

3. Julia had two apples but lost one. How many had she left ?

4. 2 apples and 1 apple are —— apples.

5. 3 apples and 1 apple are —— apples.

6. 2 apples and 2 apples are —— apples.

7. $\frac{1}{2}$ of 4 apples is —— apples.

8. $\frac{1}{2}$ of 4 inches is —— ——.

9. 3 peaches and 3 peaches are —— peaches.

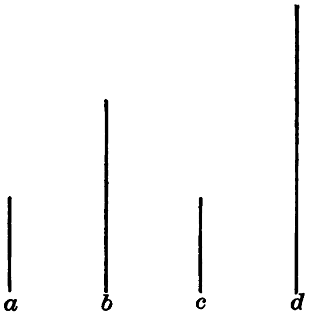
10. $\frac{1}{2}$ of six peaches is —— peaches.

11. How many *a*'s are equal to *d*?

12. *a* is equal to —— —— of *b*.

13. *a*, *b*, and *c* are equal to how many *a*'s?

14. *a* is equal to —— —— of *d*.



15. *b* is equal to what part of *d*?

16. Write figure 6 five times, or until you can write it well.

OPTIONAL

1. Draw a line 6 inches long.
2. How many 2-inch lines will it equal?
3. How many 3-inch lines will it equal?
4. $\frac{1}{2}$ of six inches is —— inches.
5. $\frac{1}{3}$ of six inches is —— inches.
6. A 2-inch line equals —— —— of a 6-inch line.
7. A 3-inch line equals —— —— of a 6-inch line.

8. Tell a story about 3 little birds, when one of them flew away.

9. Tell a story about 6 crows and a farmer who caught two of them.

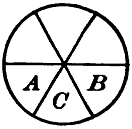
10. Tell a story about 6 squirrels and a bad dog.

11. Tell a story of 4 peanuts, half of them bad.

XIII. — ADDITION, SIX

Use a 12-inch rule

1. 1 inch and 1 inch are —— inches.
2. 2 inches and 1 inch are —— inches.
3. 3 inches and 2 inches are —— inches.
4. 3 inches and 1 inch are —— inches.
5. 4 inches and 1 inch are —— inches.
6. 3 inches and 3 inches are —— inches.
7. 4 inches and 2 inches are —— inches.
8. 5 inches and 1 inch are —— inches.
9. 3 inches and 2 inches are —— inches.
10. 2 inches and 3 inches are —— inches.
11. 2 inches and 4 inches are —— inches.
12. The whole circle is equal to how many *A*'s?
13. *A*, *B*, and *C* are equal to —— *A*'s.



14. How many times must 3 *A*'s be taken to equal the whole circle?
15. $\frac{1}{2}$ of the circle equals —— *A*'s.
16. $\frac{1}{3}$ of the circle equals —— *A*'s.

OPTIONAL

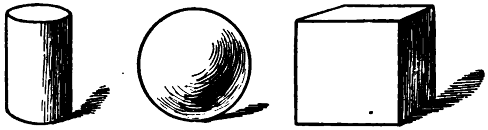
1. 2 inches are $\frac{1}{2}$ of —— inches.
2. 3 inches are $\frac{1}{2}$ of —— inches.

3. 2 inches are $\frac{1}{3}$ of —— inches.
4. 1 inch is $\frac{1}{2}$ of —— inches.

5. Tell a story about 6 birds, using the number $\frac{1}{2}$.
6. Tell a story about 6 hens, using the number $\frac{1}{3}$.
7. Tell a story about 4 boys and 2 more joining them.

XIV. — THREE

Arrange models as in the picture

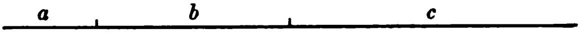


1. Look at the picture of the cylinder, ball, and cube, then close your eyes or cover the picture and think how they are arranged.
2. Which solid is on the right?
3. Which solid is on the left?
4. Name the solids in order, beginning at the left.
5. Name the solids in order, beginning at the right.
6. How many solids in the picture?
7. If the cylinder be removed, how many solids will remain?

8. If both the cylinder and the ball be removed, how many solids will remain ?

9. 2 solids and 1 solid are —— solids.

10. 3 solids less 1 solid are —— solids.



11. If *a* is 2, how much is *b* ?

12. How much is *c* ?

13. How much are *a* and *b* together ?

14. How much are *a*, *b*, and *c* together ?

15. *a* is equal to —— —— of *c*.

16 *b* is equal to —— —— of *c*.

OPTIONAL

1. Place three things on your desk.

2. Now close your eyes and think how they look.

3. Name them in order from the left.

4. Name them in order from the right.

5. If two of them be removed, how many will remain ?

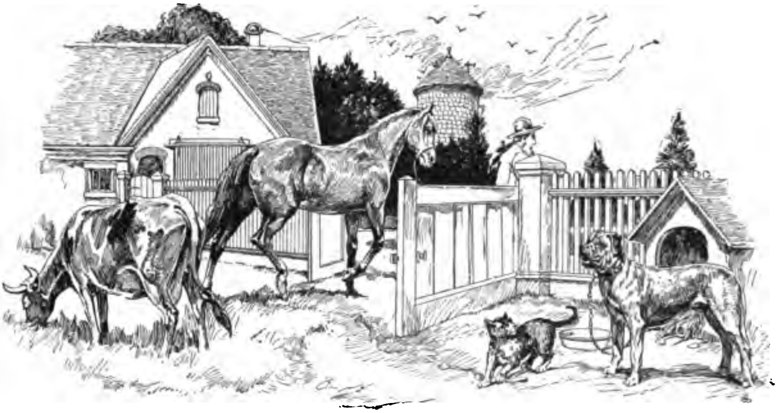
6. How many must be removed to leave two ?

7. Tell a story of a girl having 6 marbles and losing some.

8. Tell a story of a boy having 2 tops and finding others.

9. Tell a story of a man finding 2 canes every day for 3 days.

XV. — FOUR, EIGHT



1. Look at the animals in the picture, then close your eyes or cover the picture and think how they are arranged.

2. How many groups are there?

3. What animals in the left-hand group?

4. What animals in the right-hand group?

5. How many animals in all? (Uncover the picture.)

6. How many legs has the horse?

7. How many legs has the cow?

8. How many horns has the cow?

9. Each animal has —— legs.

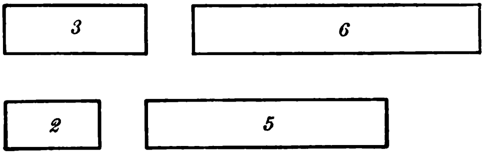
10. Each animal has —— ears.

11. The cow has —— horns.

12. How many fours in : : | : : ? Two fours are eight.

13. How many legs have the cat and the dog together?

14. How many more legs than horns has the cow?

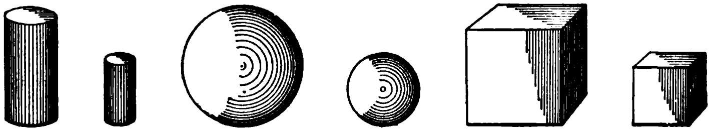


15. How many 3's are equal to 6?
16. How many 2's are equal to 6?
17. 3 is equal to —— —— of 6.
18. 2 is equal to —— —— of 6.
19. 2 and 3 together are equal to ——.

OPTIONAL

1. 4 boys have —— hands.
2. 2 chairs have —— legs.
3. $\frac{1}{2}$ of eight legs is —— legs.
4. A horse, cow, dog, and cat together have —— ears.
5. Tell a story about some animals, using the number eight.
6. Tell a story, using the numbers three and six.
7. Tell a story, using the numbers 4 and 2.

XVI.—SIX, SIGNS OF ADDITION AND EQUALITY



1. How many solids in the picture?

2. Observe them carefully; then close your eyes or cover the picture.

3. Name the two solids on the right.

4. What two solids are next?

5. Name the remaining two.

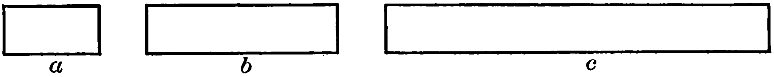
6. How many solids of each kind?

7. (Open your eyes.) How many kinds of solids?

8. How many twos in six?

9. 2 solids and 2 solids and 2 solids are —— solids.

10. 3 twos are ——.



11. If *c* equals one dozen, how much is *b*?

12. How much is *a*?

13. How many *a*'s are equal to *c*?

14. *a* is —— —— of a dozen.

15. 2 threes are ——.

16. 4 threes are ——.

NOTE. — The sign + is read "*and*" or "*plus*." The sign = is read "*are*" or "*equal*."

OPTIONAL

1. 2 eggs + 2 eggs + 2 eggs = —— eggs.

2. A child having six eggs, broke 3 of them. How many had she left?

3. 2 cylinders + 2 balls + 2 cubes = —— solids.

4. If the 2 cylinders and the 2 balls be removed, how many solids will remain?

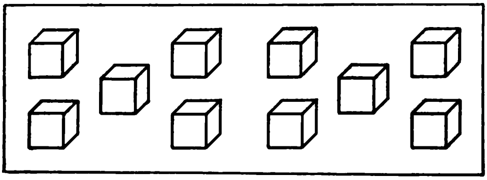
5. Tell a story, using the numbers 2 and 4 and ½ a dozen.

6. Tell a story, using a dozen, and half a dozen.

7. Tell a story, starting with six things and losing several of them.

XVII. — TEN, SIGN OF SUBTRACTION

Let the pupil arrange cubes as shown



1. How many cubes in the first group?

2. How many cubes in the second group? There are ten cubes in all.

3. How many fives in ten?

4. How many more cubes in the first group than in the second?

5. What part of all the cubes is in the first group?

6. What part of all the cubes is in the second group?

7. 5 cubes + 5 cubes = —— cubes.

8. Ten cubes − 5 cubes = —— cubes.

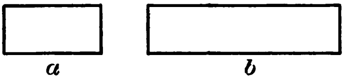
9. ½ of ten cubes = —— cubes.

10. ½ of eight dots (: : | : :) = —— dots.

11. ½ of six dots (: : :) = —— dots.

12. ½ of four dots (: :) = —— dots.

13. *a* is equal to —— —— of *b*.



14. If $a = 5$, b equals ——.

15. *b* is equal to —— *a*'s.

NOTE. — The sign − is read "*less*" or "*minus*."

OPTIONAL

1. Draw four straight lines side by side and a slanting line across them.
2. How many straight lines in all?
3. Do this again.
4. How many straight lines in the two groups?

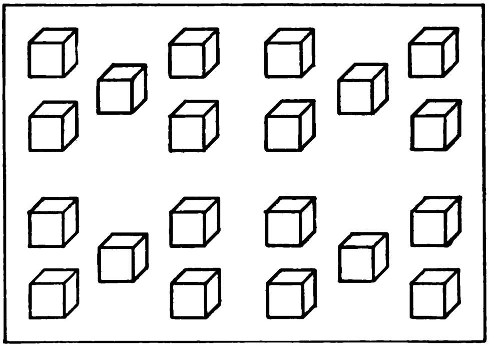
5. Tell a story, using 5 large apples and 5 small ones.

6. Tell a story, using 4 girls and 4 boys.

7. Tell a story, using ten cents with two boys taking a trolley ride.

XVIII. — TWENTY

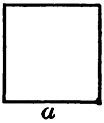
Let the pupil arrange cubes as shown

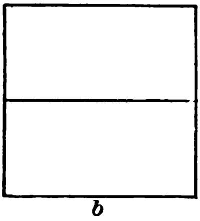


1. How many tens in the picture ?
   One ten is written 10.
   Two tens are written 20. (Twenty.)
   This figure (0) is called naught.
2. How many fives in the picture ?
3. How many tens in 20 ?
4. How many fives in 20 ?
5. What is $\frac{1}{2}$ of 20 ?
6. What is $\frac{1}{2}$ of 10 ?
7. 2 tens are ——.

8. 2 fives are ——.

9. 4 fives are ——.





10. *b* is equal to how many *a*'s?

11. If *a* is equal to 5, then *b* is equal to ——.

12. *a* is equal to —— —— of *b*.

13. 5 is —— —— of 20.

14. Write 10 and 20 five times neatly, or until you can write them well.

OPTIONAL

1. 5 chairs + 5 chairs + 5 chairs + 5 chairs = —— chairs.

2. If car fare is 5 cents, how much must 4 boys pay for a ride?

3. How many rides can a girl take for ten cents?

4. James and John took two rides. How much did they pay?

5. How many boys can take a ride for ten cents?

6. How many boys can take a ride for twenty cents?

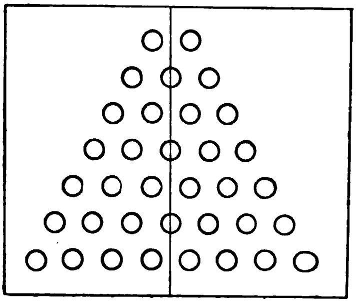
7. Tell a story, using 5 and 20.

8. Tell a story, using 10 and $\frac{1}{2}$.

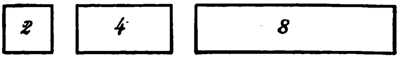
9. Tell a story, using 20 and $\frac{1}{2}$.

10. Tell a story of a boy who took several rides on a street car for 20 cents.

XIX. — ONE HALF, EIGHT



1. ½ of 2 balls is how many balls?
2. ½ of 3 balls is how many balls?
3. ½ of 4 balls is how many balls?
4. ½ of 5 balls is how many balls?
5. ½ of 6 balls is how many balls?
6. Six ⁚ ⁚ ⁚ 6. Seven ⁚ ⁚ ⁚ • 7. Eight ⁚ ⁚ ⁚ ⁚ 8.
7. How many twos in 6?
8. How many twos in 8?
9. What do we call one more than 6?
10. ½ of 7 balls is how many balls?
11. ½ of 8 balls is how many balls?
12. How many 2's in 8?



13. How many 4's in 8?
14. 2 is equal to what part of 8?
15. 4 is equal to what part of 8?
16. Write the figure 7 five times, or until you can write it well.

OPTIONAL

1. 7 is 1 more than ——.
2. 3 twos and one are ——.

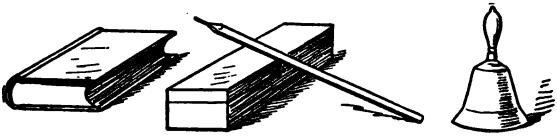
3. 2 balls are $\frac{1}{2}$ of —— balls.
4. 3 balls are $\frac{1}{2}$ of —— balls.

5. Tell a story having 3 boys and 3 girls in pairs and one boy alone.

6. Tell a story about eight cents given to two boys.

7. Tell a story showing how many cows would have eight horns.

XX. — FOUR, ONE FIFTH



1. Observe the picture carefully, then close your eyes or cover the picture and think how the objects are arranged.

2. How many objects in all?

3. Name them from right to left.

4. Name them from left to right.

5. Name the second object from the left.

6. Name the second object from the right.

7. If the bell be removed, how many objects will remain?

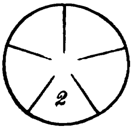
8. If the book and the box be removed, how many objects will remain?

9. 2 things + 2 things = —— things.

10. 4 things − 1 thing = —— things.

11. 4 things − 2 things = —— things.

12. If each part of this circle is 2, how much is the whole circle?



13. There are —— 2's in 10.

14. 2 is —— —— of 10.

15. $\frac{1}{2}$ of the circle is ——.

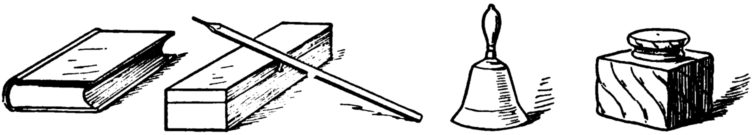
Note. — The teacher should give similar exercises with various objects, until four objects can be readily visualized by the pupil.

OPTIONAL

1. Cut a strip of paper into halves.
2. Cut each half into two equal parts.
3. Each of these parts is —— —— of the whole strip.
4. Now cut these pieces into two equal parts.
5. Now you have —— pieces.

6. Tell a story with numbers under eight.
7. Tell a story with numbers 6 and $\frac{1}{3}$.

XXI. — FIVE



1. How many objects in this picture?

2. Close your eyes, or cover the picture.

3. Name the objects in order from the left.

4. Name the objects in order from the right.

5. If the inkwell be removed, how many objects will remain?

6. If the inkwell and the bell be removed, how many objects will remain?

7. If the inkwell and the bell and the pencil be removed, how many objects will remain?

8. Name the first two objects from the left.

9. Name the first two objects from the right.

10. 5 things − 1 thing = —— things.

11. 5 things − 2 things = —— things.

12. 5 things − 3 things = —— things.

13. Subtract at sight quickly:

$$\begin{array}{ccc} 5 & 5 & 5 \\ \underline{1} & \underline{2} & \underline{3} \end{array}$$

14. Add at sight quickly:

$$\begin{array}{ccc} 2 & 2 & 3 \\ \underline{1} & \underline{2} & \underline{2} \end{array}$$

OPTIONAL

1. Four letters, each bearing a 2-cent stamp, would cost —— cents for postage.

2. 6 cents would pay for —— 2-cent postage stamps.

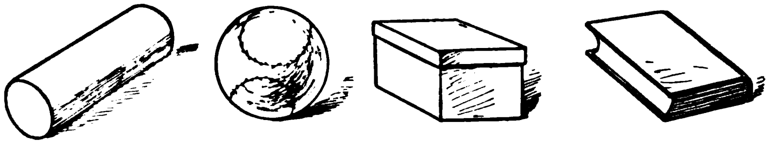
3. Three letters, each bearing a 2-cent stamp, and one letter bearing a 1-cent stamp, would cost —— cents for postage.

4. If envelopes cost 1 cent each, how many can be bought for 5 cents?

5. Tell of spending 6 cents for postage stamps.

6. Tell a story about buying a 2-cent stamp with a nickel.

XXII.—REVIEW



1. Observe the picture carefully, then close your eyes, or cover the picture.

2. Name the objects from right to left.

3. Name the objects from left to right.

4. Name the third object from the left.

5. Name the third object from the right.

6. If the cylinder be removed, how many objects will remain?

7. If the cylinder and the ball be removed, how many objects will remain?

8. If three objects be removed, how many will remain?

9. 4 things − 1 thing = —— things.

10. 4 things − 2 things = —— things.

11. 4 things − 3 things = —— thing.

12. Add at sight:

$$\begin{array}{r} \\ 3 \\ 3 \\ \hline \end{array} \qquad \begin{array}{r} 2 \\ 2 \\ 2 \\ \hline \end{array} \qquad \begin{array}{r} \\ 4 \\ 4 \\ \hline \end{array}$$

13. Subtract at sight:

$$\begin{array}{r} 4 \\ 1 \\ \hline \end{array} \qquad \begin{array}{r} 4 \\ 2 \\ \hline \end{array} \qquad \begin{array}{r} 4 \\ 3 \\ \hline \end{array}$$

OPTIONAL

1. With a rule measure eight inches on a sheet of paper.

2. How many 2-inch lines will measure the same distance?

3. How many 4-inch lines?

4. There are —— twos in eight.

5. There are —— fours in eight.

6. Place 8 beans in two equal groups. How many beans in each group?

7. Take steps 2 feet long. How many steps to walk 8 feet?

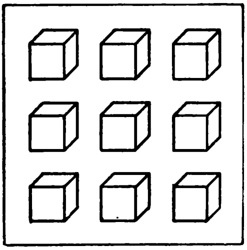
8. A man may take steps 3 feet long. How many steps to walk six feet?

9. Tell a story about 8 marbles and 2 boys.

10. Tell a story about 4 girls having 2 dolls apiece.

XXIII.—NINE

Let the pupil arrange cubes as shown



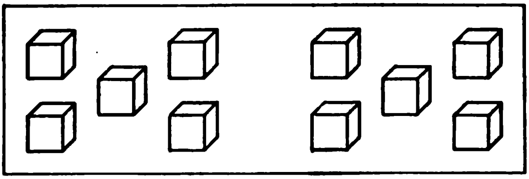
1. How many cubes in the first row?

2. How many cubes in the second row?

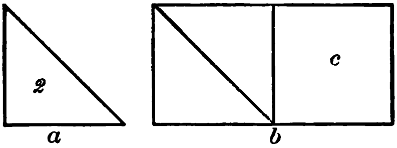
3. How many cubes in the third row?
4. How many rows are there?

3 threes are nine.

5. How many cubes in the picture?



6. How many cubes in the first group?
7. How many cubes in the second group?
8. How many cubes in all?
9. 2 fives are ——.
10. 3 threes are ——.
11. 9 is —— less than ten.
12. 9 is —— more than eight.
13. How many 3-inch lines will measure a 9-inch line?



14. How many *a*'s are equal to *b*?
15. *a* is equal to —— —— of *c*.
16. *a* is equal to —— —— of *b*.

17. If $a = 2$, b equals ——, and c equals ——.

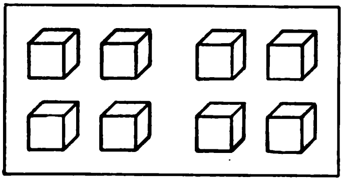
18. a and b together equal ——.

OPTIONAL

1. 5 books + 5 books = —— books.
2. 4 pens + 4 pens + 1 pen = —— pens.
3. ½ of 10 books is —— books.
4. ½ of eight cents is —— cents.

5. Tell a story about 2 girls and 10 cherries.
6. Tell a story about 5 boys and 10 peaches.
7. Tell a story of a trolley ride, 10 cents, and the number ½.

XXIV. — EIGHT, NINE, REVIEW



1. How many groups in the picture?
2. How many cubes in the first group?
3. How many cubes in the second group?
4. How many cubes in all?
5. 3 cubes + 3 cubes + 3 cubes = —— cubes.
6. 5 cubes + 5 cubes = —— cubes.
7. 4 cubes + 4 cubes = —— cubes.
8. ½ of 8 cubes = —— cubes.
9. ½ of 10 cubes = —— cubes.

10. $\frac{1}{3}$ of 9 cubes = ——— cubes.

11. If $a = 2$, how much does b equal?

12. How much is c?

13. b is equal to ——— ——— of c.

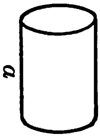
14. a is equal to ——— ——— of c.

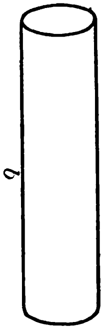
15. a and b together = ———.

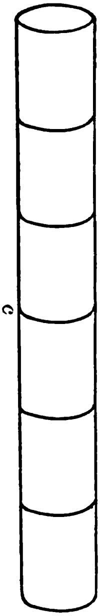
16. b is ——— more than a.

17. c is ——— more than b.

18. 2 is ——— ——— of 12.







OPTIONAL

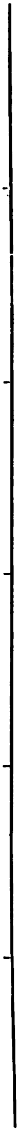
Add at sight:

1.	2.	3.	4.	5.	6.	7.
3	5	4	2	2	3	2
3	5	4	2	2	3	2
3			2	2		2
				2		2
						2

8. Tell a story of 8 sticks of candy and 4 girls.
9. Tell a story about 5 boys getting 2 cents apiece.
10. Tell a story about 10 cents given to five girls.

XXV. — EIGHT, NINE, REVIEW

1. John had 4 cents, and his father gave him one more. How many had he then?

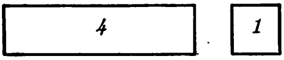


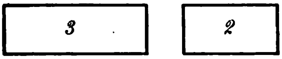
2. Mary had 3 rings, and her mother gave her 2 more. How many had she then?

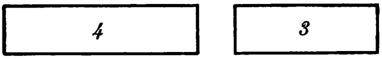
3. Fred had 5 marbles, but lost one. How many had he left?

Use a foot rule

4. 4 inches + 1 inch = —— inches.
5. 3 inches + 2 inches = —— inches.
6. 5 inches + 1 inch = —— inches.
7. 4 inches + (   ) inches = 6 inches.
8. 5 books + 2 books = —— books.
9. 4 books + 3 books = —— books.
10. 3 inches + 3 inches = —— inches.
11. 4 inches − 1 inch = —— inches.
12. 4 inches − 2 inches = —— inches.
13. 4 inches − 3 inches = —— inch.
14. 5 inches − 2 inch = —— inches.
15. 5 inches − 2 inches = —— inches.







16. 4 and 1 are ——.
17. 3 and 2 are ——.

18. 4 and 3 are ——.

19. 4 and 2 are ——.

20. 3 and 1 are ——.

21. 3 and 2 and 1 are ——.

22. 4 and 4 are ——.

23. Write the figure 9 five times, or until you can write it well.

OPTIONAL

1. Jane found a hen's nest with 6 eggs. How many times must she reach for them, taking two eggs at a time?

2. A boy took two steps up a ladder, and then two more. He took —— steps in all.

3. A girl took 4 steps up a stairway, and then half as many more. In all she took —— steps.

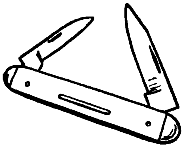
4. Charles having 6 eggs in his cap fell and broke 2 of them. He had only —— eggs left.

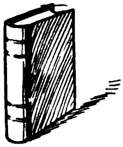
5. Tell a story of 6 lemon drops given to 3 boys.

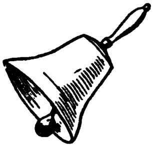
6. Tell a story of 6 pears and 2 girls, using the number $\frac{1}{2}$.

XXVI.—FOUR, REVIEW

The actual objects are better







1. Observe the picture carefully. Close your eyes or cover the picture.

2. Name the objects in order from left to right.

3. Name the objects in order from right to left.

4. Name the third object from the left.

5. Name the third object from the right.

6. Name the first object on the left.

7. Name the first object on the right.

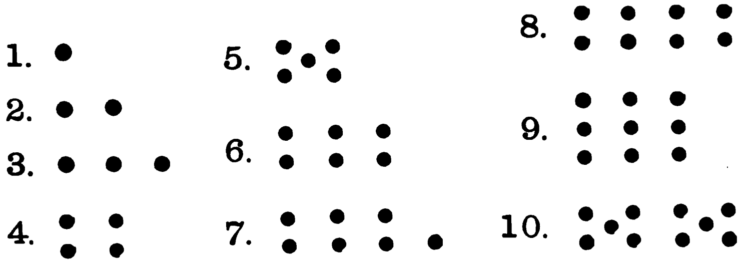
8. If the cup and the bell be removed, how many objects will remain?

9. If three of the objects be removed, how many will remain?

10. If a top and a pencil be placed with these objects, how many will there be?

11. If instead of the bell we place 2 objects, how many will there be?

12. Copy the first ten numbers, as follows



OPTIONAL

1. Find how many twos in 10, using dots or other things.

2. 3 threes are ——. 5 dots and 4 dots = —— dots.

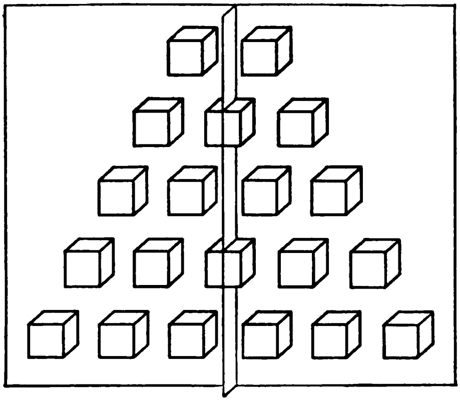
3. There are 8 marbles in a boy's pocket. To take them all out, 2 at a time, he must reach for them —— times.

4. A boy having 8 cents lost 2 of them. He had —— left.

5. Give an account of 10 men crossing a river, two at a time.[1]

6. Tell a story of 8 girls crossing a river in a boat, 2 at a time.[1]

XXVII.—HALVES OF NUMBERS TO SIX

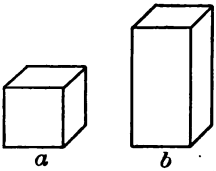


1. What is ½ of 2 cubes?
2. What is ½ of 3 cubes?
3. What is ½ of 4 cubes?
4. What is ½ of 5 cubes?

---

[1] Boatman not counted.

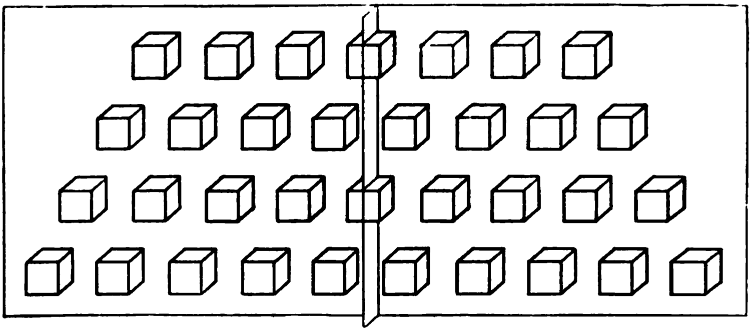
5. What is $\frac{1}{2}$ of 6 cubes?
6. 1 cube + 1 cube = —— cubes.
7. $1\frac{1}{2}$ cubes + $1\frac{1}{2}$ cubes = —— cubes.
8. 2 cubes + 2 cubes = —— cubes.
9. $2\frac{1}{2}$ cubes + $2\frac{1}{2}$ cubes = —— cubes.
10. 3 cubes + 3 cubes = —— cubes.
11. 6 cubes − 3 cubes = —— cubes.
12. 4 cubes − 2 cubes = —— cubes.
13. If *a* is $1\frac{1}{2}$, how much is *b*?
14. How much more is *b* than *a*?
15. How much less is *a* than *b*?
16. If *b* is 5, how much is *a*?
17. How much more is *b* than *a*?



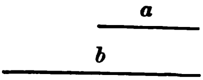
OPTIONAL

1. Draw a line 3 inches long, and mark off the inches.
2. Divide the line into halves by a point.
3. How long is each half?
4. Draw a line 5 inches long and divide it into halves.
5. How long is each half?
6. Tell a story about 3 pencils, using the number $\frac{1}{2}$.
7. Tell a story about 5 cookies, using the number $\frac{1}{2}$.
8. Tell a story about giving 2 little girls a ribbon 5 feet long.
9. Tell a story about 5 pounds of butter in 2 packages.

XXVIII. — HALVES OF NUMBERS FROM SEVEN TO TEN



1. What is ½ of 7 cubes?
2. What is ½ of 8 cubes?
3. What is ½ of 9 cubes?
4. What is ½ of 10 cubes?
5. 3½ cubes + 3½ cubes = —— cubes.
6. 4 cubes + 4 cubes = —— cubes.
7. 4½ cubes + 4½ cubes = —— cubes.
8. 5 cubes + 5 cubes = —— cubes.
9. ½ of 7 apples = —— apples.
10. ½ of 8 apples = —— apples.
11. ½ of 9 apples = —— apples.
12. ½ of 10 apples = —— apples.
13. *b* is equal to how many *a*'s?
14. If *b* is 7, how much is *a*?
15. How much more is *b* than *a*?



16. How much less is *a* than *b*?
17. If *b* is 9, how much is *a*?
18. How much more is *b* than *a*?
19. How much less is *a* than *b*?

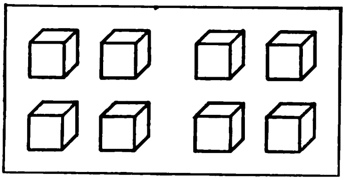
OPTIONAL

1. 7 cubes − $3\frac{1}{2}$ cubes = —— cubes.
2. 8 cubes − 4 cubes = —— cubes.
3. 9 cubes − $4\frac{1}{2}$ cubes = —— cubes.
4. 10 cubes − 5 cubes = —— cubes.

5. Tell a story about 7 peaches, using the number $\frac{1}{2}$.
6. Tell a story about 9 lemons, using the number $\frac{1}{2}$.

XXIX.—PROBLEMS, NUMBERS TO TWELVE

The real cubes preferred



1. How many fours in 8?

2. How many twos in 8?

3. How many twos in 4?

4. What is $\frac{1}{2}$ of 8 cubes?

5. At 2 cents each how many apples can be bought for 4 cents?

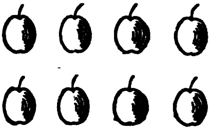
6. At 4 cents each how many apples can be bought for 8 cents?

7. A boy having 8 cents lost one cent. How many had he left?

8. A girl having 8 cents lost 4 cents. How many had she left?

9. Charles having 6 marbles received 2 more. How many had he then?

10. Jane gave Charles 2 apples from her 8 apples. How many remained?

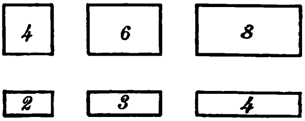


11. $\frac{1}{2}$ of 5 apples = —— apples.

12. $\frac{1}{2}$ of 3 apples = —— apples.

13. How many 2's are equal to 4?

14. How many 3's are equal to 6?



15. How many 4's are equal to 8?

16. 2 equals —— —— of 4.

17. 3 equals —— —— of 6.

18. 4 equals —— —— of 8.

19. If 2 cost 6 cents, what will 4 cost?

20. If 3 cost 4 cents, what will 6 cost?

21. If 4 cost 5 dollars, what will 8 cost

OPTIONAL

1. 6 plums + 2 plums = —— plums.
2. 7 plums + 1 plum = —— plums.
3. 8 plums − 1 plum = —— plums.
4. 4 plums + 3 plums = —— plums.

5. 7 plums − 1 plum = —— plums.

6. Tell a story of 8 oranges, 2 of them bad, and the rest given to 3 girls.

7. Tell a story of 7 pears, 2 of them bad, and the rest given to 2 boys.

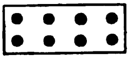
XXX. — EIGHT, REVIEW

1. $\frac{1}{2}$ of 8 peaches = —— peaches.

2. $\frac{1}{2}$ of 4 apples = —— apples.

3. $\frac{1}{2}$ of 2 apples = —— apple.

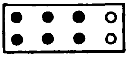
4. 4 marbles + 4 marbles = —— marbles.



4 + 4 =

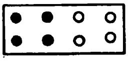
5. 2 books + 2 books = —— books.

6. 8 cents − 2 cents = —— cents.



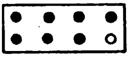
8 − 2 =

7. 8 cents − 4 cents = —— cents.



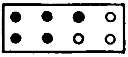
8 − 4 =

8. 8 cents − 1 cent = —— cents.



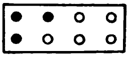
8 − 1 =

9. 8 cents − 3 cents = —— cents.



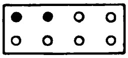
8 − 3 =

10. 8 cents − 5 cents = —— cents.



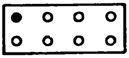
8 − 5 =

11. 8 cents − 6 cents = —— cents.



8 − 6 =

12. 8 cents − 7 cents = —— cents.



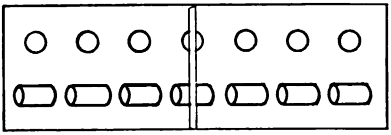
8 − 7 =

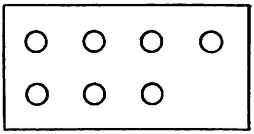
Note. — Give an exercise in visualization, using four or more objects.

OPTIONAL

1. 5 pens + 2 pens = —— pens.
2. 6 pens + 2 pens = —— pens.
3. 7 pens − 2 pens = —— pens.
4. 8 pens − 3 pens = —— pens.
5. 5 pens + 3 pens = —— pens.
6. Tell a story of 4 kittens, using the number 8.
7. Tell a story of 6 days, 3 of them rainy.

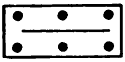
XXXI. — SEVEN, REVIEW



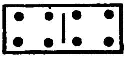


1. $\frac{1}{2}$ of 7 balls (or spheres) is how many balls?
2. $\frac{1}{2}$ of 7 cylinders is how many cylinders?
3. 4 balls + 3 balls = —— balls.
4. 7 balls − 3 balls = —— balls.
5. 7 birds sat on a tree and 4 of them flew away. How many were left?
6. John had 5 dollars and his father gave him 2 more. How many had he then?
7. 6 dollars + 1 dollar = —— dollars.

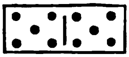
8. 2 threes are ——.



9. 2 fours are ——.



10. 2 fives are ——.



11. 7 balls − 2 balls = —— balls.

12. If 7 apples cost 6 cents, what would 3½ apples cost?

13. If 3½ apples cost 5 cents, what would 7 apples cost?

OPTIONAL

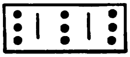
1. Draw a line 7 inches long.
2. Mark it off into inches.
3. Find ½ of 7 inches.
4. ½ of 7 inches + ½ of an inch = —— inches.
5. 7 inches − 5 inches = —— inches.

6. Tell a story about 7 eggs, and a boy who had an accident.

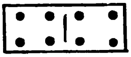
7. Tell a story about 7 bananas, using the number ½.

XXXII.—BY TENS TO ONE HUNDRED

1. 3 threes are ——.

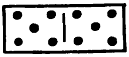


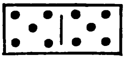
2. 2 fours are ——.



3. 4 twos are ——.

4. 2 tens are ——.





5. How many fives in 20?

6. 3 tens are 30 (thirty).
7. 4 tens are ——.
8. 5 tens are ——.

(And so on to exercise 13.)

13. 10 tens are 100 (one hundred).

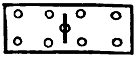
NOTE. — Give an exercise in visualizing, using four or five objects (See Lesson XXI.)

OPTIONAL

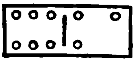
1. 20 plums were divided equally between 2 boys. Each boy received —— plums.
2. 10 marbles were divided equally between 2 boys. Each boy received —— marbles.
3. $\frac{1}{2}$ of 20 = ——. $\frac{1}{2}$ of 10 = ——.
4. 2 boys had 5 cents each. They both had —— cents.
5. 4 boys had 5 cents each. They all had —— cents.
6. Tell a story, using the numbers 10 and $\frac{1}{2}$.
7. Tell a story, using the numbers 20 and $\frac{1}{2}$.

XXXIII. — TEN, REVIEW

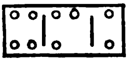
Real cubes or balls would be better



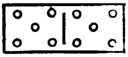
1. $\frac{1}{2}$ of 9 balls is how many balls?
2. 4 balls + 4 balls + 1 ball = —— balls.



3. 6 balls + 3 balls are —— balls.
4. 8 balls + 1 ball = —— balls.
5. 9 balls − 1 ball = —— balls.



6. 7 balls + 2 balls = —— balls.
7. 9 balls – 4 balls = —— balls.



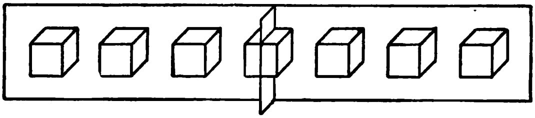
8. 9 balls – 5 balls = —— balls.
9. 9 balls + 1 ball are —— balls.
10. 10 balls – 1 ball = —— balls.
11. $\frac{1}{2}$ of 10 balls = —— balls.

12. If 10 balls are worth four dollars, what are 5 balls worth?

13. If 9 balls weigh 2 pounds, what will $4\frac{1}{2}$ balls weigh?

14. If 8 balls cost 2 dollars, what will 4 balls cost?

OPTIONAL

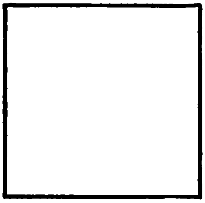


1. 8 cubes and 2 cubes are —— cubes.
2. 8 cubes – 2 cubes are —— cubes.
3. $\frac{1}{2}$ of 7 cubes is —— cubes.
4. $\frac{1}{2}$ of 7 days is —— days.
5. 3 pencils + 4 pencils are —— pencils.

6. Tell a story, using the numbers 7 and 3.
7. Tell a story, using the numbers $\frac{1}{2}$ and 9.
8. Tell a story of 7 pounds of sugar put up in two equal packages.

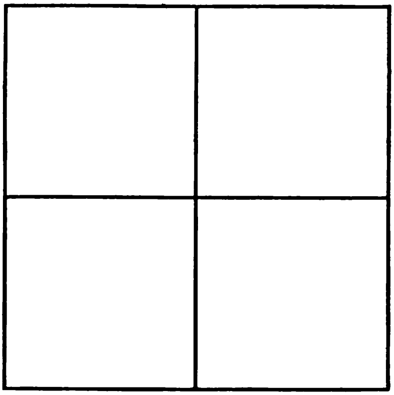
XXXIV. — SQUARES, ONE, FOUR, NINE

These squares should be drawn by the pupils and ruled as shown



1-inch square

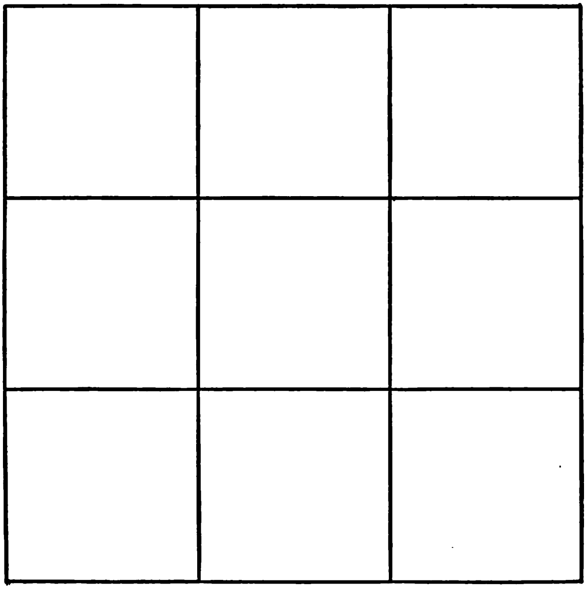
1. How long is the 1-inch square?
2. How wide is it?



2-inch square

3. How long and how wide is the 2-inch square?
4. How long and how wide is the 3-inch square?
5. How many 1-inch squares are equal to the 2-inch square?

6. How many 1-inch squares are equal to the 3-inch square?



3-inch square

7. The 1-inch square is equal to what part of the 2-inch square?

8. If an inch square be taken away from the 2-inch square, how many squares will remain?

9. How many inch squares in $\frac{1}{2}$ of a 2-inch square?

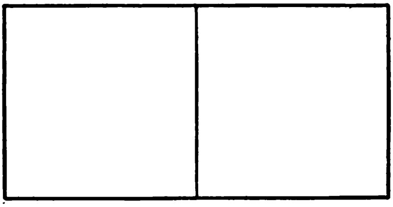
10. The 1-inch square is equal to —— —— of a 3-inch square.

11. If 3 one-inch squares be taken from a 3-inch square, how many 1-inch squares will remain?

OPTIONAL

1. 2 1-inch squares are ———— ———— of the 2-inch square.
2. 3 1-inch squares are ———— ———— of the 2-inch square.
3. 4 1-inch squares are ———— ———— of the 2-inch square.
4. 3 1-inch squares are ———— ———— of the 3-inch square.
5. 6 1-inch squares are ———— ———— of the 3-inch square.
6. Tell a story, using the numbers $\frac{1}{3}$ and 9.
7. Tell a story, using the numbers 2 and 9.

XXXV.—RECTANGLES, ONE, FOUR

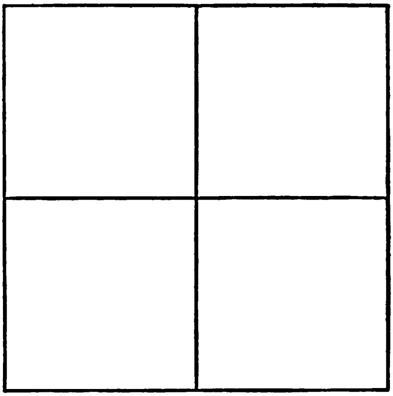


2 inches

1. Draw a rectangle 2 inches long and 1 inch wide.
2. Divide it into halves, as in the picture.
3. What may we call each half?
4. Draw a rectangle 2 inches by 2 inches.
5. By drawing two lines divide it into quarters.
6. How many 1-inch squares in the first rectangle?

7. How many 1-inch squares in the second rectangle?

8. Each 1-inch square is equal to what part of the first rectangle?



2 inches

9. A 1-inch square is equal to what part of the second rectangle?

10. 2 1-inch squares are equal to —— —— of the second rectangle?

11. Both of the rectangles contain —— 1-inch squares.

12. (A rectangle whose length and width are equal is also called a square.)

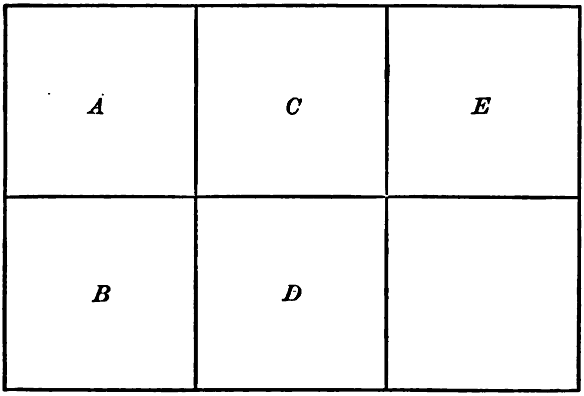
OPTIONAL

1. The second rectangle contains —— more squares than the first.

2. Half a dozen oranges + 2 oranges = —— oranges.
3. Half a dozen oranges − 2 oranges = —— oranges.
4. Half a dozen oranges + 1 orange = —— oranges.
5. 6 oranges + 3 oranges = —— oranges.

6. Tell a story of half a dozen eggs.
7. Tell a story, using the numbers 4 and 6.

XXXVI. — RECTANGLES, ONE, SIX



1. Draw a rectangle 3 inches by 2 inches.

2. Divide it into 1-inch squares as in the picture.

3. How many 1-inch squares are there?

4. How many 1-inch squares in $\frac{1}{2}$ of the rectangle?

5. Each 1-inch square is —— —— of $\frac{1}{2}$ of the rectangle.

6. Squares *A* and *B* are what part of the rectangle?

7. Squares *A*, *B*, and *C* are —— —— of the rectangle.

8. Squares *A*, *B*, *C*, and *D* are —— —— of the rectangle.

9. Squares *A*, *C*, and *E* are —— —— of the rectangle.

10. The rectangle has —— equal squares.

11. One square is —— —— of the rectangle.

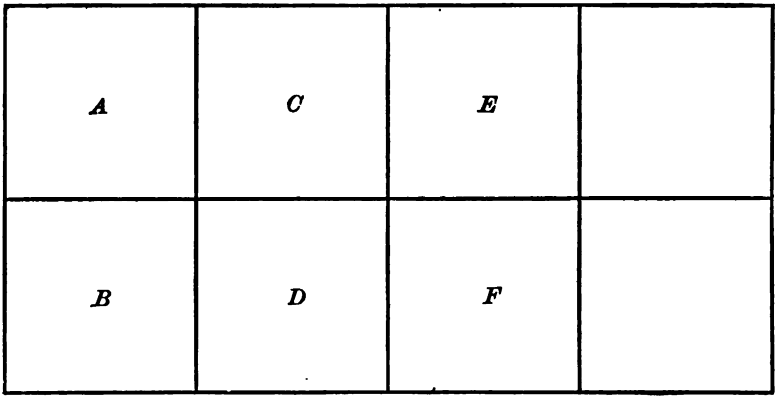
OPTIONAL

1. 2 squares are —— —— of the rectangle.
2. 3 squares are —— —— of the rectangle.
3. 4 squares are —— —— of the rectangle.
4. 5 squares are —— —— of the rectangle.
5. There are —— ones in six.
6. One is —— —— of six.
7. There are —— twos in six.
8. Two is —— —— of six.
9. There are —— threes in six.
10. Three is —— —— of six.
11. At 3 cents each 2 oranges cost —— cents.
12. At 2 cents each 3 postage stamps cost —— cents.

13. Tell a story, using the numbers $\frac{1}{3}$ and 6.

14. Tell a story of a little girl who ate 2 eggs daily until she had eaten 6 eggs.

XXXVII.—RECTANGLES, ONE, EIGHT



1. Draw a rectangle 4 inches by 2 inches.

2. Divide it into 1-inch squares.

3. How many 1-inch squares in it?

4. How many 1-inch squares in ½ of the rectangle?

5. Squares *A* and *B* are —— —— of ½ of the rectangle.

6. The four squares at the bottom are —— —— of the rectangle.

7. The squares *A*, *B*, *C*, and *D* are —— —— of the rectangle.

8. The squares *A*, *B*, *C*, *D*, *E*, and *F* are —— —— of the rectangle.

9. There are —— squares in all.

10. One square is —— —— of the rectangle.

11. If *A*, *B*, *C*, and *D* are worth 6 cents, what is the whole rectangle worth?

12. If the whole rectangle is worth 10 cents, what are *A*, *B*, *C*, and *D* together worth?

13. Squares A and B are —— —— of the rectangle.

14. Four times 2 squares = —— squares.

15. One fourth of 8 squares = —— squares.

16. If A and B together are worth 2 cents, the whole rectangle is worth —— cents.

17. Four 2's are ——.

18. If the whole rectangle is worth 8 cents, A is worth —— cent.

19. There are —— ones in eight.

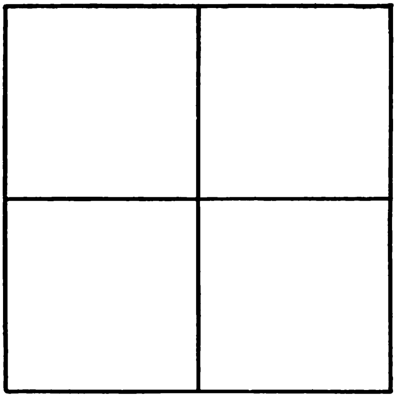
20. There are —— twos in eight.

OPTIONAL

1. $\frac{1}{2}$ of 8 squares = —— squares.
2. $\frac{1}{4}$ of 8 squares = —— squares.
3. $\frac{2}{4}$ of 8 squares = —— squares.
4. $\frac{3}{4}$ of 8 squares = —— squares.
5. 3 squares + 5 squares = —— squares.

6. Tell a story of 8 apples, $\frac{1}{4}$ of them decaying.
7. Tell a story, using $\frac{3}{4}$ and 8.

XXXVIII.—RECTANGLES, ONE, SEVEN, PROBLEMS



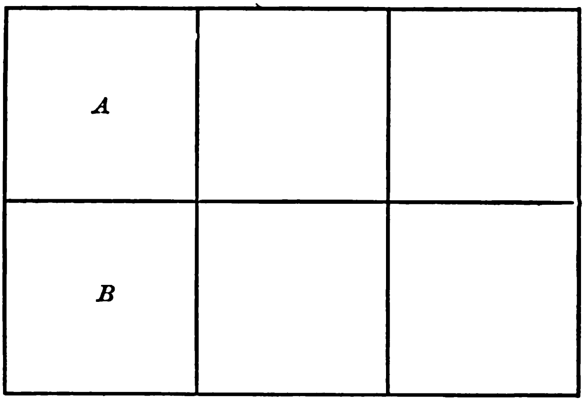
1. 2 squares + 2 squares = —— squares.
2. 1 square + 3 squares = —— squares.
3. There are —— squares in the drawing.
4. Two more squares would make —— squares.
5. —— more squares would make 7 squares.
6. —— squares are 3 squares more than 4 squares.
7. 7 squares – 3 squares = —— squares.
8. 3 squares + ( ) square = 4 squares.
9. 3 squares + 3 squares = —— squares.
10. 4 squares + 2 squares = —— squares.
11. 5 squares + ( ) square = 6 squares.
12. 2 squares + ( ) squares = 6 squares.
13. 4 squares – 2 squares = —— squares.

14. 4 squares – 3 squares = —— square.

15. 4 squares – 1 square = —— squares.

16. How many more squares in the second rectangle than in the first?

17. 6 – 4 = ——.



18. If *A* and *B* together are worth 4 cents, what is the whole rectangle worth?

19. 3 fours are ——.

20. If *A* and *B* together are worth $3\frac{1}{2}$ cents, what is the 2-inch square worth?

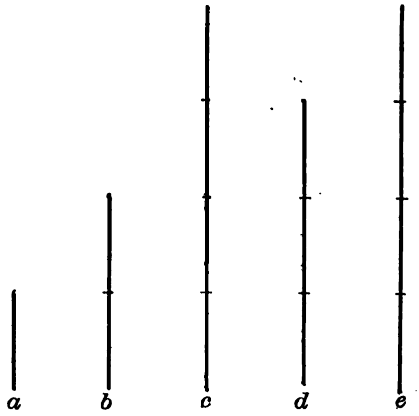
21. 2 times $3\frac{1}{2}$ are ——.

OPTIONAL

1. 4 squares + $\frac{1}{2}$ of 6 squares = —— squares.
2. 4 squares + $\frac{1}{3}$ of 6 squares = —— squares.
3. 4 squares + $\frac{2}{3}$ of 6 squares = —— squares.

4. 6 squares + $\frac{1}{2}$ of 4 squares = —— squares.
5. 6 squares + $\frac{3}{4}$ of 4 squares = —— squares.
6. Tell a story, using the numbers $\frac{2}{3}$ and 6.

XXXIX. — MAGNITUDES, ADDITION



1. *a* is equal to —— —— of *b*.
2. How many *a*'s are equal to *d*?
3. How many *a*'s are equal to *c*?
4. *a* is equal to what part of *d*?
5. How many *a*'s are equal to *e*?
6. *a* and *b* together are equal to which line?
7. How many *b*'s are equal to *e*?
8. *b* and *d* together equal how many *a*'s?
9. *b* and *c* together equal how many *a*'s?

10. *d* and *e* together equal how many *a*'s?
11. *a* is equal to what part of *e*?
12. *b* is equal to what part of *e*?
13. *a* and *b* together are equal to what part of *e*?
14. One third of *d* is equal to ——.
15. Two thirds of *d* are equal to ——.
16. *c* and *e* together are equal to —— *b*'s.
17. Add at sight:

1	2	2	2	3
2	2	3	1	4
			3	

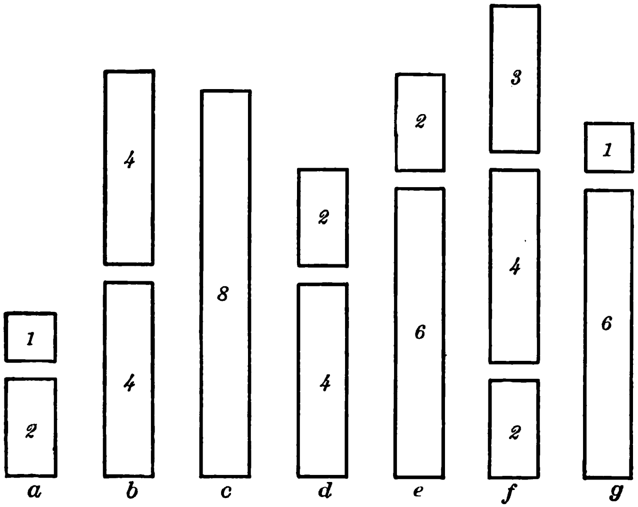
OPTIONAL

1. Draw a line 2 inches long. Draw another 3 inches long. Draw a third line 5 inches long.
2. The first 2 lines together are —— inches long.
3. All three lines together are —— inches long.
4. The last line is —— inches longer than the second line.
5. The first line is —— inches shorter than the last line.

XL.—MAGNITUDES, ADDITION AND SUBTRACTION

1. How many ones in column *a*?
2. How many ones in column *b*? *e*? *f*? *g*?
3. How many *a*'s are equal to *d*?
4. How many *a*'s are equal to *f*?

5. How many ones in *a* and *d* together?
6. How many ones in *a* and *g* together?



7. Name the three equal columns.
8. Add column *f*.
9. Column *a* is equal to what part of column *d*?
10. Column *a* is equal to what part of column *f*?
11. 3 equals ——— ——— of 6.
12. 3 equals ——— ——— of 9.
13. ——— ——— of 6 equals 3.
14. ——— ——— of 9 equals 3.

OPTIONAL

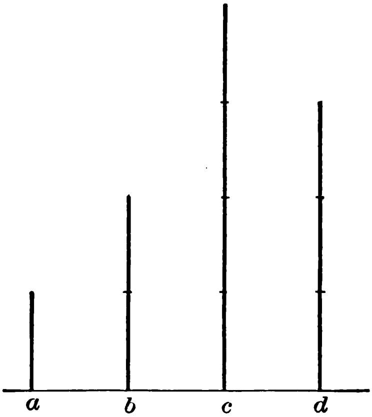
1. Column *a* is ——— less than column *c*.
2. Column *g* is ——— more than column *a*.

3. Column *d* is —— more than column *a*.
4. Column *a* is —— less than column *e*.
5. Column *f* is —— more than column *a*.
6. Column *f* is —— more than column *d*.

7. Tell a story about 10 birds and 7 of them going away.

8. Tell a story about 3 birds and 7 more joining them.

XLI.—MAGNITUDES, ONE THE UNIT



1. If $a = 1$, how much is *b*?
2. How much is *c*?
3. How much is *d*?
4. Find the sum of *a* and *b*. (How much are both together?)
5. Find the sum of *a* and *d*.

6. Add a, b, and c. (How much are all three together?)

7. Add b, c, and d.

8. Add all four lines.

9. If $a = 2$, how much is b?

10. How much is c?

11. How much is d?

12. Add at sight:

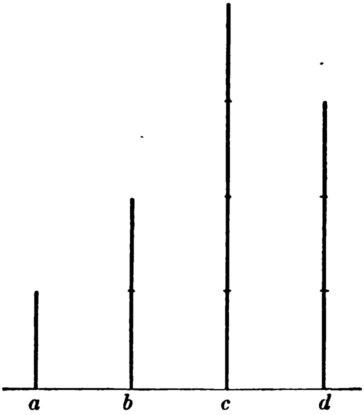
$$\begin{array}{ccccc} 1 & 1 & 1 & 2 & 1 \\ \underline{2} & \underline{3} & 2 & 4 & 2 \\ & & \underline{4} & \underline{3} & 4 \\ & & & & \underline{3} \end{array}$$

OPTIONAL

1. If $a = 1$, how much is $b - a$?
2. $c - b =$ ——.
3. $d - a =$ ——.
4. $d - b =$ ——.
5. $c - d =$ ——.
6. $b + c - a =$ ——.
7. $a + d - b =$ ——.
8. A boy had 2 kittens, 2 dogs, and 2 hens. How many animals had he in all?
9. A little girl having 4 chestnuts, found 3 more. Then she had ——.
10. 2 books taken from 7 books leave —— books.

11. Tell a story about 4 lambs worth one dollar apiece.
12. Tell a story about a man with three dollars, who bought several things for 1 dollar each.

XLII. — MAGNITUDES, TWO THE UNIT



1. If $a = 2$, how much is b?
2. How much is c?
3. How much is d?
4. Add a and b.
5. Add a and c.
6. Add a and d.
7. How much longer is b than a?
8. c is —— longer than d.
9. c is —— longer than a.
10. a is equal to —— —— of b, —— —— of c, and —— —— of d.
11. b is twice as long as ——.
12. d is one and —— —— times as long as b.

13. Add at sight:

$$\begin{array}{r} 2 \\ \underline{2} \end{array} \qquad\qquad \begin{array}{r} 2 \\ 2 \\ \underline{2} \end{array} \qquad\qquad \begin{array}{r} 2 \\ 2 \\ 2 \\ 2 \\ \underline{2} \end{array}$$

14. Subtract at sight:

$$\begin{array}{r} 4 \\ \underline{2} \end{array} \qquad\qquad \begin{array}{r} 8 \\ \underline{6} \end{array} \qquad\qquad \begin{array}{r} 8 \\ \underline{2} \end{array}$$

OPTIONAL

1. b is equal to —— —— of c.
2. Add a, b, and d.
3. b is equal to —— —— of d.
4. $a + d - b =$ ——.
5. $b + d - a =$ ——.

6. Tell a story about selling 2 pencils worth 2 cents apiece.

7. Tell a story about buying 3 postage-stamps worth 2 cents apiece.

XLIII. — ABSTRACT NUMBERS

Add at sight, then copy and add:

1. $$\begin{array}{r} 2 \\ \underline{1} \end{array} \qquad \begin{array}{r} 1 \\ \underline{1} \end{array} \qquad \begin{array}{r} 1 \\ \underline{2} \end{array} \qquad \begin{array}{r} 2 \\ \underline{2} \end{array} \qquad \begin{array}{r} 3 \\ \underline{2} \end{array} \qquad \begin{array}{r} 3 \\ \underline{1} \end{array}$$

2.	3	2	1	5	4	4
	3	3	3	1	2	1

3.	4	4	1	2	4	3
	3	4	1	1	1	1
			1	1	1	1

Subtract at sight, then copy and subtract:

4.	2	1	4	3	4	4
	1	1	2	1	1	3

5.	5	6	5	6	5	5
	1	1	4	2	3	2

6. Draw a 2-inch square on paper and cut it out. Place one side parallel with the front edge of your desk. Fold the edge nearest you upon the opposite edge. Crease. Unfold. Fold the right edge upon the left edge. Crease and unfold as before. A 2-inch square is equal to —— 1-inch squares.

OPTIONAL

1. There are 3 twos in ——.
2. There are 2 twos in ——.
3. There are 4 twos in ——.
4. There are 5 twos in ——.
5. There are 2 threes in ——.
6. Tell a story about not more than 10 squares.
7. Tell a story of an unfortunate hen with 10 chickens.

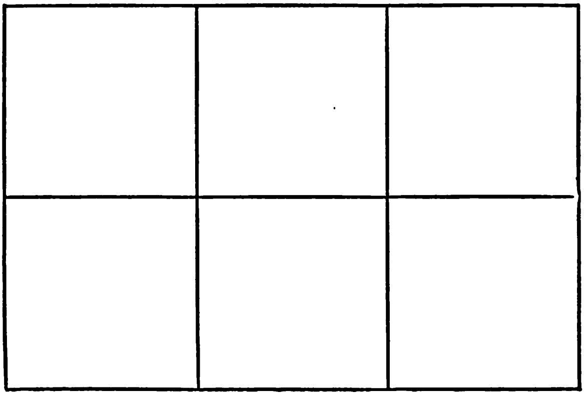
XLIV. — ABSTRACT NUMBERS, HALVES AND THIRDS

Add at sight, then copy and add:

1.	1 2 1	2 1 3	4 2 1	3 2 1	2 3 2	1 2 4
2.	4 3	5 2	2 1 4	2 2 1	2 2 2	6 1

Subtract at sight, then copy and subtract:

3.	6 1	5 4	7 2	7 5	7 4	7 3
4.	7 6	6 3	6 5	6 4	3 1	3 2



5. This rectangle is —— inches long and —— inches wide.

6. It contains —— 1-inch squares.

7. Each 1-inch square is equal to —— —— of the rectangle.

8. $\frac{1}{3}$ of the rectangle is equal to —— 1-inch squares.

9. $\frac{1}{2}$ of the rectangle is equal to —— 1-inch squares.

10. $\frac{1}{2}$ of 6 = ——.

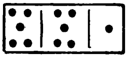
OPTIONAL

1. 3 squares are —— —— of the rectangle.
2. 3 squares are $\frac{1}{2}$ of —— squares.
3. 2 squares are —— —— of the rectangle.
4. 2 squares are $\frac{1}{3}$ of —— squares.
5. 4 squares are —— —— of the rectangle.
6. 4 squares are $\frac{2}{3}$ of —— squares.
7. Tell a story about squares, using the number $\frac{1}{3}$.

XLV. — TEN TO TWENTY

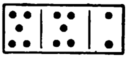
One ten is written thus (10), as we have seen.

1. One ten and 1 are written 11.



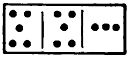
Eleven

2. One ten and 2 are written 12.



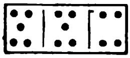
Twelve.

3. One ten and 3 are written ——.



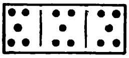
Thirteen.

4. One ten and 4 are written ——.



Fourteen.

5. One ten and 5 are written ——.



Fifteen.

6. One ten and 6 are written ——.
7. One ten and 7 are written ——.
8. One ten and 8 are written ——.
9. One ten and 9 are written ——.
10. One ten and 10 (two tens) are written ——.

Add at sight, then copy and add:

11.	4	4	5	4	4	5
	4	3	3	2	1	2

12.	4	4	3	1	3	2
	2	3	1	2	2	2
	1	1	2	3	1	4

OPTIONAL

Add:

1.	10	10	10	10	10
	1	2	3	4	5

2.	10	10	10	10	10
	6	7	8	9	10

XLVI. — REVIEW

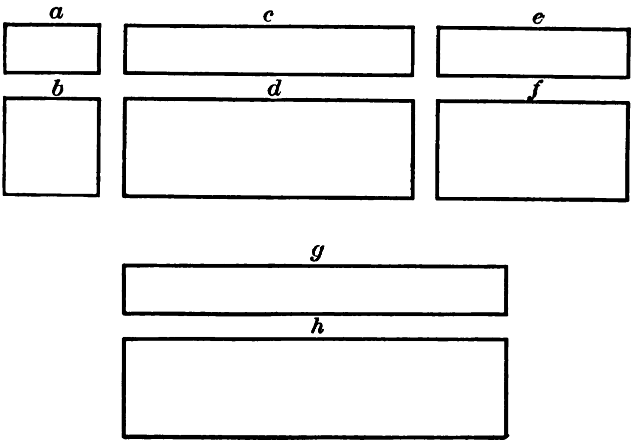
1. 2 ones = ——.
2. 2 fours = ——.
3. 2 threes = ——.
4. 2 fives = ——.
5. $\frac{1}{2}$ of 2 = ——.
6. $\frac{1}{2}$ of 10 = ——.
7. $\frac{1}{2}$ of 6 = ——.
8. $\frac{1}{2}$ of 4 = ——.
9. $\frac{1}{2}$ of 8 = ——.
10. $\frac{1}{2}$ of 3 = ——.
11. $\frac{1}{2}$ of a dozen = ——.
12. 2 twos = ——.
13. 3 twos = ——.
14. 2 sixes = ——.
15. 4 twos = ——.

OPTIONAL

1. John paid 10 cents for a ball. James paid half as much for a ball. How much did James pay?
2. Draw a line 9 inches long. Draw a line $\frac{1}{3}$ as long.
3. The second line is —— inches long.
4. $\frac{2}{3}$ of 9 inches are —— inches.
5. $\frac{1}{3}$ of 9 inches + 2 inches = —— inches.
6. $\frac{2}{3}$ of 9 inches − 2 inches = —— inches.
7. Tell a story, using 9 cents and the number $\frac{2}{3}$.
8. Tell a story, using any three numbers.

NOTE. — If the work in this book is thoroughly done to this point at the close of the first year at school, the pupil will have a good foundation upon which to build during the second year. While much more can be done the first year under good conditions, slow advancement and thorough assimilation now will insure more satisfactory progress later.

XLVII.—MAGNITUDES, ROMAN SYSTEM, I-IV



1. If we call *a* 1, what shall we call *b*?
2. What shall we call *c*?
3. What shall we call *d*?
4. What shall we call *e*?
5. What shall we call *f*?
6. What shall we call *g*?
7. What shall we call *h*?
8. What shall we call *a* and *b* together?
9. What shall we call *c* and *d* together?
10. What shall we call *e* and *f* together?
11. What shall we call *g* and *h* together?
12. If *b* cost 4 cents, what should *a* cost?

13. What should *c* cost?
14. What should *d* cost?
15. What should *e* cost?
16. What should *f* cost?
17. What should *g* cost?
18. What should *a* and *b* cost?
19. What should *b* and *f* cost?

Copy and learn:

20. I = 1.
II = 2.
III = 3.
IV = 4.

OPTIONAL

1. If *a* cost 3 cents, what should *a* and *b* together cost?

2. If *c* cost 4 cents, what should *c* and *d* together cost?

3. If *f* cost 9 cents, what should *e* cost?

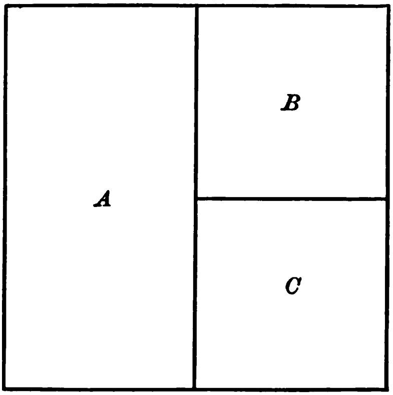
4. If *h* cost 8 cents, what should *h* and *g* together cost?

5. Add at sight:

$$\begin{array}{cccc} 2 & 4 & 6 & 8 \\ \underline{1} & \underline{2} & \underline{3} & \underline{4} \end{array}$$

6. Make concrete examples of the 5th exercise. The first example might be put this way: A boy had 2 apples and his brother gave him one more. Then he had 3 apples.

XLVIII. — ABSTRACT NUMBERS TO EIGHT AND PROBLEMS



1. If *A* is worth 6 cents, how much is *B* worth?
2. How much is *C* worth?
3. How much is the whole figure worth?
4. How much are *B* and *C* together worth?

Add at sight, supplying the missing numbers, then copy in full:

5. $$\begin{array}{cccc} 1 & 1 & 2 & 2 \\ \underline{1} & \underline{2} & \underline{1} & \underline{2} \end{array}$$

6. $$\begin{array}{cccc} 3 & 3 & 4 & 1 \\ \underline{2} & \underline{1} & \underline{1} & \underline{} \\ & & & 2 \end{array}$$

$$\begin{array}{lcccc} 7. & 2 & 2 & 1 & 3 \\ & & & & \\ & \overline{3} & \overline{4} & \overline{3} & \overline{5} \end{array}$$

$$\begin{array}{lcccc} 8. & 3 & 4 & 2 & 3 \\ & & & & \underline{3} \\ & \overline{4} & \overline{5} & \overline{5} & \end{array}$$

$$\begin{array}{lcccc} 9. & 2 & 1 & 1 & 2 \\ & 2 & 3 & 1 & 1 \\ & \underline{1} & \underline{1} & \underline{2} & \\ & & & & \overline{5} \end{array}$$

$$\begin{array}{lcccc} 10. & 2 & 1 & 3 & 3 \\ & 2 & 3 & 2 & 1 \\ & \underline{2} & \underline{2} & \underline{2} & \underline{3} \end{array}$$

11. Make concrete examples of the 7th exercise. The first example might be put thus: A girl who has 2 cents will have 3 cents if she gets one more cent.

OPTIONAL

1. If 2 pencils cost 6 cents, 1 pencil costs —— cents, and 4 pencils cost —— cents.
2. If 3 books cost 9 dollars, 1 book costs —— dollars, and 2 books cost —— dollars.
3. If half a dozen slate-pencils cost 4 cents, a dozen will cost —— cents.

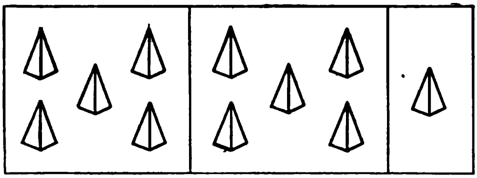
4. If a dozen pens cost 10 cents, half a dozen will cost —— cents.

5. Add at sight:

5	4	5	4
2	2	3	4

6. Make concrete examples of the 5th exercise. The first example might be: 5 chairs were in the dining-room and 2 chairs were in the kitchen. There were 7 chairs in all.

XLIX. — ELEVEN, ROMAN SYSTEM, V-VII



Eleven. 11.

1. 10 pyramids + 1 pyramid = —— pyramids.
2. 9 pyramids + ( ) pyramids = 11 pyramids.
3. 8 pyramids + ( ) pyramids = 11 pyramids.
4. 7 pyramids + ( ) pyramids = 11 pyramids.
5. 6 pyramids + ( ) pyramids = 11 pyramids.
6. 11 pyramids – 1 pyramid = —— pyramids.
7. 11 pyramids – 2 pyramids = —— pyramids.
8. 11 pyramids – 3 pyramids = —— pyramids.
9. 11 pyramids – 4 pyramids = —— pyramids.
10. 11 pyramids – 5 pyramids = —— pyramids.

11. 11 pyramids – 10 pyramids = —— pyramid.
12. 11 pyramids – 9 pyramids = —— pyramids.
13. 11 pyramids – 8 pyramids = —— pyramids.
14. 11 pyramids – 7 pyramids = —— pyramids.
15. 11 pyramids – 6 pyramids = —— pyramids.
16. Subtract at sight:

$$\begin{array}{cccc} 7 & 6 & 7 & 7 \\ \underline{2} & \underline{3} & \underline{1} & \underline{3} \end{array}$$

17. Copy and learn:

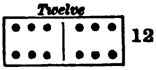
V = 5.
VI = 6.
VII = 7.

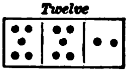
18. Make concrete examples of the 16th exercise. The first might be: 7 sheep were in a field. Two of them were driven to the barn, leaving only five in the field.

OPTIONAL

1. Draw a rectangle that shall contain 10 one-inch squares.
2. How much do you lack of having 11 one-inch squares?
3. Draw a rectangle 1 inch long and $\frac{1}{2}$ of an inch wide. Call it 3.
4. Now draw a rectangle that you may call 9.

L.—TWELVE, ROMAN SYSTEM, VIII–X





1. 6 dots + 6 dots = ——— dots.
2. 11 dots + 1 dot = ——— dots.
3. 10 dots + (   ) dots = 12 dots.
4. 9 dots + (   ) dots = 12 dots.
5. 8 dots + (   ) dots = 12 dots.
6. 7 dots + (   ) dots = 12 dots.
7. 6 dots + (   ) dots = 12 dots.
8. 12 dots – 11 dots = ——— dot.
9. 12 dots – 10 dots = ——— dots.
10. 12 dots – 9 dots = ——— dots.
11. 12 dots – 8 dots = ——— dots.
12. 12 dots – 7 dots = ——— dots.
13. 12 dots – 6 dots = ——— dots.
14. 12 dots – 5 dots = ——— dots.
15. 2 sixes = ———.
16. $\frac{1}{2}$ of 12 = ———.
17. $\frac{1}{2}$ of a dozen = ———.
18. 12 dots – 1 dot = ——— dots.
19. 12 dots – 2 dots = ——— dots.
20. 12 dots – 3 dots = ——— dots.

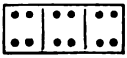
21. 12 dots − 4 dots = —— dots.

22. 12 dots − 5 dots = —— dots.

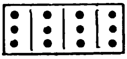
23. Copy and learn: VIII = 8.
IX = 9.
X = 10.

OPTIONAL

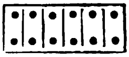
1. $\frac{1}{3}$ of 12 = ——.



2. $\frac{1}{4}$ of 12 = ——.
3. $\frac{3}{4}$ of 12 = ——.



4. $\frac{1}{2}$ of 12 = ——.
5. $3 + \frac{1}{2}$ of 12 = ——.
6. $\frac{1}{2}$ of $12 + 4$ = ——.
7. $\frac{1}{6}$ of 12 = ——.
8. $\frac{2}{3}$ of 12 = ——.



9. Tell how a dozen oranges were divided equally among 3 boys.

10. Tell how a dozen oranges were divided equally among 4 girls.

LI. — ELEVEN, REVIEW

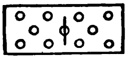
1. 7 boys and 4 boys are —— boys.
2. 8 girls and 2 girls are —— girls.
3. 7 books and 2 books are —— books.
4. 5 girls and 3 boys are —— children.
5. 4 bells and 6 bells are —— bells.
6. 3 bells and 6 bells are —— bells.

7. 5 rings and 4 rings are —— rings.

8. 9 pens less 5 pens are —— pens.

9. 9 pens − 4 pens are —— pens.

10. ½ of 11 = ——.



11. Add at sight:

7	8	7	5	4	**12.**	3	5	8	10	9
4	2	2	3	6		6	4	3	1	2

13. Subtract at sight:

9	9	9	11	11
5	4	1	2	3

14. Make concrete examples of the 13th exercise.

15. If a lead pencil cost 3 cents, how much would 3 pencils cost?

16. If 2 lead pencils cost 3 cents each, how much change should be returned when a ten-cent piece is given in payment?

OPTIONAL

1. Draw a rectangle 3 inches by 4 inches. Divide it into 1-inch squares.

2. Draw a rectangle 2 inches by 5 inches. Divide it into 1-inch squares.

3. The first rectangle contains —— 1-inch squares.

4. The second rectangle contains —— 1-inch squares.

5. Make concrete examples of the 12th exercise.

LII. — TWELVE, REVIEW

Use a foot rule

1. There are 12 inches in 1 foot.
6 inches are —— —— of 1 foot.
2. 2 inches + $\frac{1}{2}$ of a foot are —— inches.
3. 1 inch more than $\frac{1}{2}$ of a foot is —— inches.
4. 9 inches are —— inches more than $\frac{1}{2}$ of a foot.
5. 2 sixes are ——.
6. $\frac{1}{2}$ of a dozen is ——.
7. 7 inches and 5 inches are —— inches.
8. 1 foot less 4 inches is —— inches.
9. 9 inches + 3 inches = —— inches.
10. 3 inches + 3 inches + 3 inches + 3 inches = —— inches.
11. 4 times 3 inches = —— inches.
12. 3 inches are —— —— of 12 inches.
13. 4 inches + 4 inches + 4 inches = —— inches.
14. 3 times 4 inches = —— inches.
15. 4 inches are —— —— of 12 inches.

OPTIONAL

1. There are —— work days in a week.
2. There are —— work days in 2 weeks.

3. One less than a dozen is ——.

4. A dozen eggs cost 20 cents. What will 6 eggs cost?

5. 6 lemons cost 8 cents. 3 lemons cost —— cents.

6. $\frac{1}{2}$ of 8 = ——.

7. A dozen oranges cost 20 cents. 3 oranges cost —— cents.

8. 3 oranges are —— —— of 12 oranges.

9. 3 oranges will cost —— —— of 20 cents.

10. Tell a story, using the numbers $\frac{1}{3}$ and 12.

11. Tell a story, using the numbers $\frac{1}{4}$ and 12.

LIII. — RECTANGLE, ROMAN SYSTEM, XI, XII

1. A rectangle has —— square corners and —— sides.

2. This rectangle is —— inches long and —— inches wide. It contains —— square inches.

3. There is a row of —— 1-inch squares along the top. There are —— such rows in all.

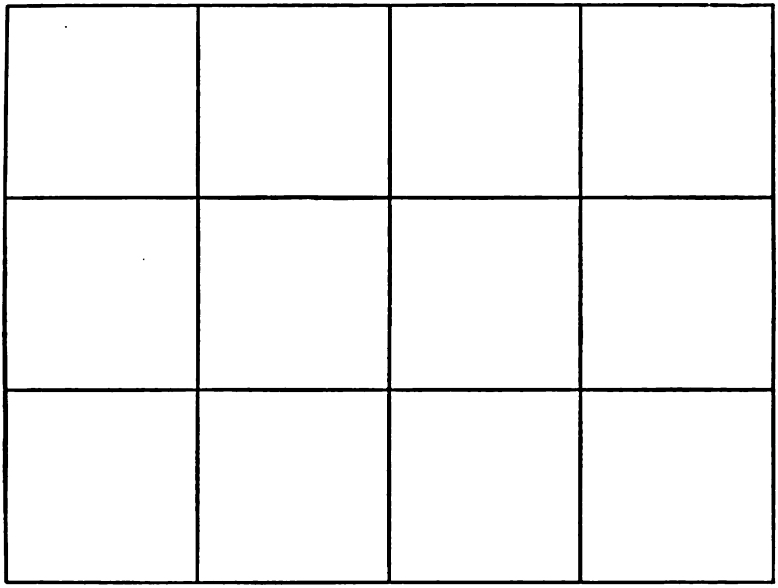
4. 3 times 4 = ——.

5. There is a row of —— 1-inch squares at the left. There are —— such rows in all.

6. 4 times 3 = ——.

7. 4 square inches are —— —— of the rectangle.

8. 3 square inches are —— —— of the rectangle.



9. 6 square inches are —— —— of the rectangle.

10. 2 times 6 square inches are —— square inches.

11. Copy and learn: XI = 11.
XII = 12.

OPTIONAL

1. 3 cats have —— feet.

2. Half a dozen mice have only —— tails, but they have —— eyes.

3. Half a dozen boys have only —— noses, but they have —— feet.

4. 3 cows have —— ears and —— feet.

5. Tell a story about half a dozen squirrels in the woods.

6. Tell a story about a little boy who tried to carry a dozen lamp chimneys.

LIV. — FRACTIONS OF TWELVE

Use a foot rule.

1. $\frac{1}{2}$ of a foot is —— inches.
2. $\frac{1}{3}$ of a foot is —— inches.
3. $\frac{1}{4}$ of a foot is —— inches.
4. $\frac{2}{2}$ of a foot are —— inches.
5. $\frac{2}{3}$ of a foot are —— inches.
6. $\frac{3}{3}$ of a foot are —— inches.
7. $\frac{2}{4}$ of a foot are —— inches.
8. $\frac{3}{4}$ of a foot are —— inches.
9. $\frac{4}{4}$ of a foot are —— inches.
10. $\frac{1}{4}$ of a foot + 3 inches is —— inches.
11. $\frac{1}{3}$ of a foot + 3 inches is —— inches.
12. $\frac{2}{3}$ of a foot + 2 inches are —— inches.
13. $\frac{3}{4}$ of a foot + 2 inches are —— inches.

OPTIONAL

1. 2 boys have —— hands and feet.
2. 3 boys have —— hands and feet.

3. Every wagon has —— wheels.
4. 2 wagons have —— wheels.
5. 3 wagons have —— wheels.
6. 12 is —— fourths of a dozen.

7. Tell a story about 4 baskets with 3 quinces in each.

8. Tell a story of 3 homes with 4 boys in each.

LV.—YARD, WEEK, MONTH, YEAR

1. Draw a line one foot long.
2. Draw a line 3 feet long.

   3 feet are 1 yard.
3. 1 foot is —— —— of a yard.
4. 2 feet are —— —— of a yard.
5. In 1 week there are —— days.
6. $\frac{1}{2}$ of a week is —— and —— —— days.
7. I was born in the month of ——.
8. There are —— months in a year.
9. One half of a year is —— months.
10. $\frac{1}{2}$ of a dozen eggs is —— eggs.
11. $\frac{1}{3}$ of a year is —— months.
12. $\frac{1}{3}$ of a dozen eggs is —— eggs.
13. $\frac{2}{3}$ of a year are —— months.
14. $\frac{2}{3}$ of a dozen eggs are —— eggs.

15. $\frac{1}{4}$ of a year is —— months.
16. $\frac{1}{4}$ of a dozen eggs is —— eggs.

OPTIONAL

1. 1 yard = —— feet.
2. 2 yards = —— feet.
3. 3 yards = —— feet.
4. 4 yards = —— feet.
5. One half of a yard = —— feet.
6. $1\frac{1}{2}$ feet + $1\frac{1}{2}$ feet = —— feet.
7. $1\frac{1}{2}$ feet are —— —— of a yard.
8. 6 feet are —— yards.

9. Tell a story of a new dress made from 4 yards of cloth that cost one dollar a yard.

10. Tell a story of a kite having a tail 3 yards long.

LVI. — YARD, WEEK, MONTH, YEAR, REVIEW

1. 6 months and 6 months and 12 months are —— years.

2. 4 eggs and 2 eggs and 6 eggs are —— dozen eggs.

3. 10 pears and 2 pears and 6 pears and 6 pears are —— dozen pears.

4. 5 days and 2 days are —— week.

5. 6 days and 1 day and $3\frac{1}{2}$ days are —— and —— —— weeks.

6. $3\frac{1}{2}$ days and $3\frac{1}{2}$ days and 7 days are —— weeks.

7. 2 feet and 1 foot are —— feet.

8. 3 feet and 2 feet and 1 foot are —— yards.

9. 3 feet and 3 feet and 3 feet are —— yards.

10. $\frac{1}{2}$ of a year = —— months.

11. $\frac{1}{2}$ of a week = —— days.

12. $\frac{1}{2}$ of a yard = —— feet.

13. $\frac{1}{3}$ of a yard = —— foot.

14. $\frac{2}{3}$ of a yard = —— feet.

15. Add at sight:

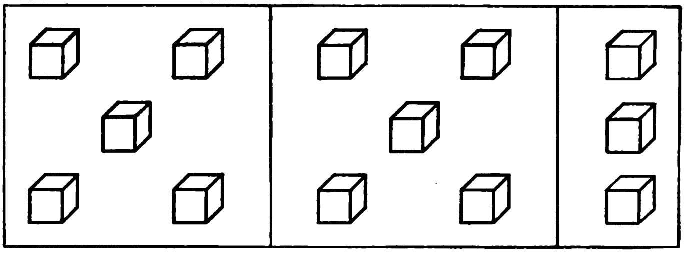
$$\begin{array}{rcr} 1\frac{1}{2} & \qquad & 3\frac{1}{2} \\ \underline{1\frac{1}{2}} & \qquad & \underline{3\frac{1}{2}} \end{array}$$

OPTIONAL

1. 2 feet are —— foot less than a yard.
2. 1 foot and —— feet make a yard.
3. From a string 2 yards long I cut off 2 feet. The string was then only —— feet long.
4. From a pole 8 feet long I cut off 2 feet. The pole was then only —— yards long.
5. 2 yards − 2 feet = —— feet.
6. 8 feet − 2 feet = —— yards.
7. 9 feet are —— yards.
8. 12 feet are —— yards.
9. 3 yards and 2 feet are —— feet.
10. $1\frac{1}{2}$ feet and $1\frac{1}{2}$ feet are ——.
11. 2 feet are —— —— of one yard.
12. Tell a story of how a ten-foot pole became 3 yards long.

LVII. — THIRTEEN

Thirteen



13

1. 10 cubes + 3 cubes = —— cubes.
2. 9 cubes + 4 cubes = —— cubes.
3. 13 cubes − 3 cubes = —— cubes.
4. 13 cubes − 4 cubes = —— cubes.
5. Mary had 13 pencils, but gave Jane 3 of them. How many had she left?
6. John had 9 cents and his mother gave him 4 more. How many had he then?
7. 6 flags + 6 flags + 1 flag = —— flags.
8. 6 flags + ( ) flags = 13 flags.
9. 8 pens + 4 pens = —— pens.
10. 8 pens + 4 pens + 1 pen = —— pens.
11. 8 pins + 5 pins = —— pins.
12. $\frac{1}{2}$ of 12 pears = —— pears.
13. $\frac{1}{2}$ of 13 pears = —— pears.
14. $6\frac{1}{2}$ pears + $6\frac{1}{2}$ pears = —— pears.

15. One foot and 1 inch are —— inches.

16. Add at sight:

$1\frac{1}{2}$	$2\frac{1}{2}$	$3\frac{1}{2}$	$4\frac{1}{2}$	$5\frac{1}{2}$	$6\frac{1}{2}$
$\underline{1\frac{1}{2}}$	$\underline{2\frac{1}{2}}$	$\underline{3\frac{1}{2}}$	$\underline{4\frac{1}{2}}$	$\underline{5\frac{1}{2}}$	$\underline{6\frac{1}{2}}$

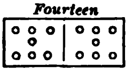
OPTIONAL

1. Thirteen books are 6 books + ( ) books.
2. 13 desks are 10 desks + ( ) desks.
3. 13 things are a dozen and —— thing.
4. 11 birds and 2 birds are —— birds.
5. 13 birds − 5 birds = —— birds.

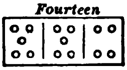
6. Tell a story of 13 children eating candy, and 3 of them made sick.

7. Tell a story of 13 boys skating, and 2 of them falling on the ice.

LVIII. — FOURTEEN



14



14

1. 2 sevens are ——.
2. 10 dots and 4 dots = —— dots.
3. 10 balls and 4 balls are —— ——.
4. $\frac{1}{2}$ of 14 balls = —— balls.
5. $\frac{1}{2}$ of 12 balls = —— balls.
6. $\frac{1}{2}$ of 13 balls = —— balls.
7. 13 inches + 1 inch = —— inches.

8. 12 inches + ( ) inches = 14 inches.

9. ½ of 10 inches = —— inches.

10. ½ of 11 inches = —— inches.

11. A rectangle 7 inches long and 2 inches wide contains —— square inches.

12. 1 foot + 2 inches = —— inches.

13. 8 inches + 6 inches = —— inches.

14. 11 inches + ( ) = 14 inches.

15. 9 inches + ( ) inches = 14 inches.

16. 14 inches − 3 inches = —— inches.

17. 14 inches − 5 inches = —— inches.

OPTIONAL

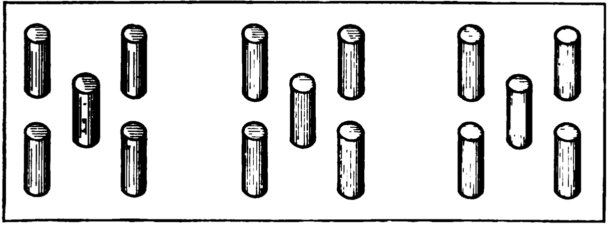
1. 3 fours + 2 = ——.
2. 13 men + 1 man = —— men.
3. 14 men — 2 men = —— men.
4. A dozen men + ( ) men = 14 men.
5. 5 pens + 5 pens + ( ) pens = 14 pens.
6. 14 pins — 3 pins = —— pins.
7. 14 pins — 4 pins = —— pins.
8. 14 pins — 5 pins = —— pins.
9. Mary is 11 years old and John is 3 years older. John is ——.
10. One year and 2 months are —— months.

11. Tell a story of a two weeks' visit, using the number 14.

12. Tell a story of a two weeks' visit with 7 stormy days.

LIX. — FIFTEEN.

Fifteen



15

1. 5 cylinders + 5 cylinders + 5 cylinders = —— cylinders.

2. 10 cylinders + ( ) cylinders = 15 cylinders.

3. 15 cylinders – 5 cylinders = —— cylinders.

4. 7 cylinders + 7 cylinders + 1 cylinder = —— cylinders.

5. 13 cylinders + ( ) cylinders = 15 cylinders.

6. 12 cylinders + ( ) cylinders = 15 cylinders.

7. 11 books + 2 books + 2 books = —— books.

8. 11 books + ( ) books = 15 books.

9. 7 pens + 3 pens + ( ) pens = 15 pens.

10. 7 pens + ( ) pens = 15 pens.

11. A rectangle 5 inches long and 3 inches wide contains —— square inches.

12. A rectangle 4 inches long and 3 inches wide contains —— square inches.

13. The first rectangle contains —— more square inches than the second.

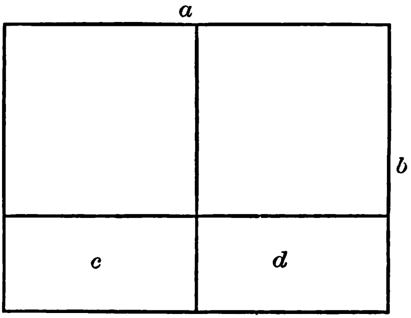
14. If 5 cylinders cost 4 cents, what will 15 cylinders cost?

15. If 15 cylinders cost 9 cents, what will 5 cylinders cost?

OPTIONAL

1. A child's foot has —— toes. 3 children's feet have —— toes.
2. $\frac{1}{3}$ of 15 cylinders = —— cylinders.
3. $\frac{2}{3}$ of 15 cylinders = —— cylinders.
4. 3 nickels are worth —— cents.
5. 15 cylinders — 10 cylinders = —— cylinders.
6. Tell a story containing the numbers 7 and 8.
7. Tell a story of 15 roses, 4 of them fading.

LX. HALVES OF ODD NUMBERS, — THREE



1. Draw a rectangle 2 inches long and $1\frac{1}{2}$ inches wide.

2. By drawing 2 straight lines divide the rectangle into as many 1-inch squares as possible.

3. Side *a* is —— inches long. Side *b* is —— inches long.

4. *c* is —— —— of a 1-inch square. *d* is also —— —— of a 1-inch square.

5. *c* and *d* together are equal to a —— inch square.

6. The rectangle contains —— square inches.

7. $1\frac{1}{2}$ square inches + $1\frac{1}{2}$ square inches = —— square inches.

8. $\frac{1}{2}$ of 3 square inches = —— square inches.

Add at sight:

9.	10	10	10	10	10
	5	2	4	3	1
10.	11	11	11	11	9
	4	2	3	1	6
11.	12	12	12	8	7
	3	1	2	7	7
12.	13	13	14	$1\frac{1}{2}$	9
	2	1	1	$1\frac{1}{2}$	3

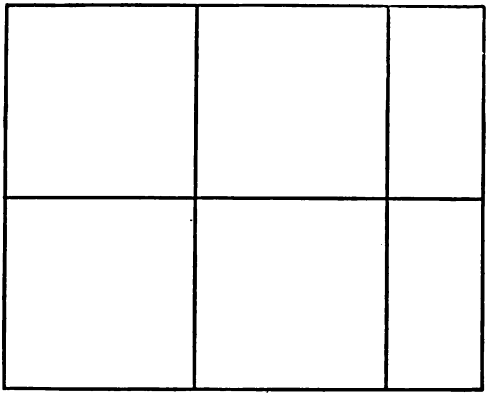
13. Divide a 3-inch line in halves.

14. 3 fives = ——. 2 sevens + 1 = ——.
15. ½ of a 5-inch line is —— inches.

OPTIONAL

1. Draw a line 3 inches long. ½ of the line is —— inches long.
2. A yard is —— feet.
3. ½ of a yard is —— feet.
4. 2 yards = —— feet.
5. 3 yards = —— feet.
6. 4 yards = —— feet.
7. 5 yards = —— feet.
8. Make concrete examples of the 13th exercise.

LXI.—HALVES OF ODD NUMBERS,—FIVE



1. Draw this rectangle.
2. It is —— inches wide and —— inches long.
3. Along the top are —— square inches.

4. Along the bottom are —— square inches.

5. $2\frac{1}{2}$ square inches + $2\frac{1}{2}$ square inches = —— square inches.

6. $\frac{1}{2}$ of 5 square inches = —— square inches.

7. If I divide 5 apples equally between two children, how many will each receive?

8. There are five school days in 1 week. In $\frac{1}{2}$ of a week there are —— school days.

9. 2 times $2\frac{1}{2}$ = ——.

10. 4 times $2\frac{1}{2}$ = ——.

11. 5 square inches − $2\frac{1}{2}$ square inches = —— square inches.

Supply the missing numbers at sight:

12.	10	9	8	4	13.	10	9	8	7
	15	15	15	15		14	14	14	14

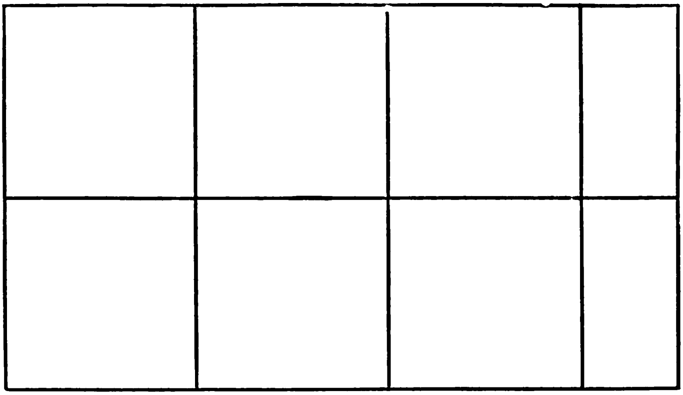
14. Make concrete examples of the 12th exercise. The first might be put this way: A man having 10 dollars found that he needed 15. He needed 5 dollars more than he had.

OPTIONAL

1. 15 is 1 more than ——, and 2 more than ——.
2. 15 is equal to a dozen and ——.
3. 5 is one $\frac{1}{2}$ of ——.

4. 5 is $\frac{1}{3}$ of ——.
5. 10 is $\frac{2}{3}$ of ——.
6. Make concrete examples of the 13th exercise.

LXII.—HALVES OF ODD NUMBERS,—SEVEN. ROMAN SYSTEM, XIII—XV



1. Draw this rectangle. It is —— inches long and —— wide.
2. The top row is —— square inches.
3. The bottom row is —— square inches.
4. 2 times $3\frac{1}{2}$ square inches = —— square inches.
5. $\frac{1}{2}$ of 7 square inches is —— square inches.
6. In $\frac{1}{2}$ of a week there are —— days.
7. $\frac{1}{2}$ of 7 = ——.

8. I had a string 7 feet long. After giving $\frac{1}{2}$ of it to Jane, I had only —— feet left.

9. Charles had 10 marbles. He lost 4 of them; then he found one. Now he has ——.

10. $\frac{1}{3}$ of a dozen is ——. $\frac{2}{3}$ of a dozen are —— . 7 is less than $\frac{2}{3}$ of a dozen.

11. 7 is more than $\frac{1}{2}$ of a dozen.

Supply the missing numbers at sight:

12. 10 9 8 7

$\overline{13}$ $\overline{13}$ $\overline{13}$ $\overline{13}$

13. 10 9 8 7 6

$\overline{12}$ $\overline{12}$ $\overline{12}$ $\overline{12}$ $\overline{12}$

14. Copy and learn:

XIII = 13.
XIV = 14.
XV = 15.

15. Add at sight:

$$\begin{array}{ccc} 1\frac{1}{2} & 2\frac{1}{2} & 3\frac{1}{2} \\ \underline{1\frac{1}{2}} & \underline{2\frac{1}{2}} & \underline{3\frac{1}{2}} \end{array}$$

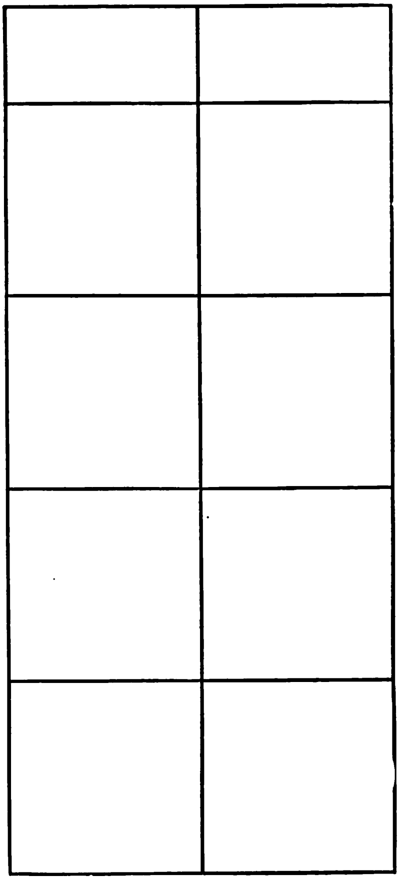
OPTIONAL

1. 6 squares + 2 half squares = —— squares.
2. 3 cents + 3 cents + 1 cent = —— cents.
3. 4 cents + 4 cents — 1 cent = —— cents.
4. 5 cubes + 3 cubes — 1 cube = —— cubes.
5. 5 cubes + 2 cubes = —— cubes.
6. 9 cubes — 2 cubes = —— cubes.

7. Tell a story of a little girl who received 5 cents a day for 2 days, and then lost 3 cents.

8. Tell the story of another little girl who found the three cents and who already had 4 cents.

LXIII. — HALVES OF ODD NUMBERS, — NINE



1. Draw this rectangle. It is —— inches long and —— inches wide.

2. It contains —— square inches.

3. ½ of the rectangle contains —— square inches.

4. 2 times 4½ = ——.

5. ½ of 9 = ——.

6. Think of a yard square. It is —— feet long and —— feet wide.

7. Now think of it as divided into 1-foot squares. At the top is a row of —— 1-foot squares.

8. There are —— such rows.

9. There are —— square feet in a yard square.

10. $\frac{1}{3}$ of a square yard is —— square feet.

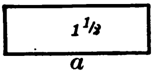
11. Supply the missing numbers at sight:

$$\begin{array}{r}10\\1\\\hline \\ \end{array}\qquad\begin{array}{r}9\\ \\\hline 11\end{array}\qquad\begin{array}{r}8\\ \\\hline 11\end{array}\qquad\begin{array}{r}7\\ \\\hline 11\end{array}\qquad\begin{array}{r}6\\ \\\hline 11\end{array}$$

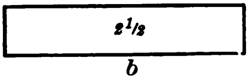
12. 2 fives = ——. 3 threes = ——.
3 fives = ——. 4 threes = ——.
2 threes = ——. 5 threes = ——.

13. Draw two lines each $1\frac{1}{2}$ inches long.

14. One line as long as both is —— inches long.



15. If $a = 1\frac{1}{2}$, make 3.



16. If $b = 2\frac{1}{2}$, make 5.

NOTE.—The 13th and 14th may be done by drawing or cutting.

OPTIONAL

Draw a line 9 inches long. $\frac{1}{2}$ of it is —— inches long.

2. 3 children had 3 dolls each. Altogether they had —— dolls.

3. In 9 there are —— threes.

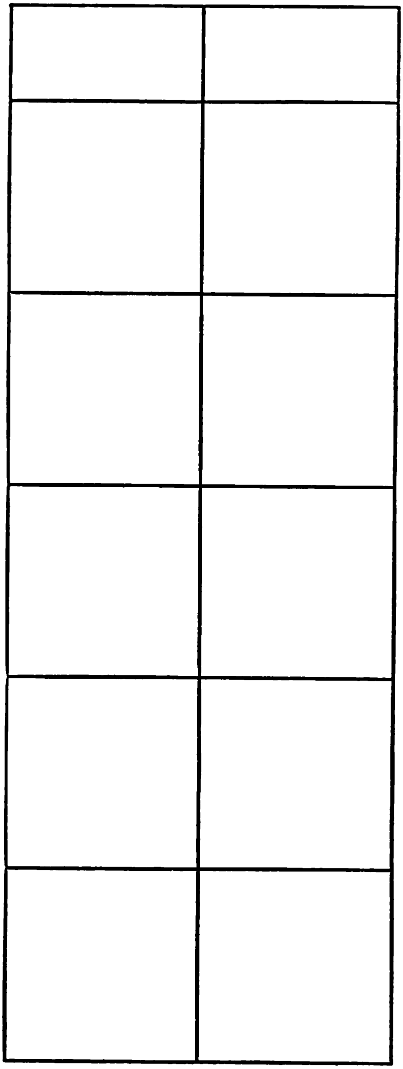
4. Draw a line 6 inches long. Draw it 3 inches longer. It is now —— inches long.

5. 6 and 3 are ——.

6. 9 apples are —— less than a dozen apples.

7. Make concrete examples of the 11th exercise.

LXIV.—HALVES OF ODD NUMBERS,—ELEVEN



1. This rectangle is —— inches long and —— inches wide. Draw it.

2. It contains —— square inches.

3. ½ of the rectangle contains —— square inches.

4. 2 times 5½ = ——.

5. ½ of 11 = ——.

6. 3 threes + 2 = ——.

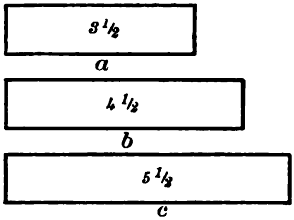
7. 2 fours + 3 = ——.

8. 2 fives + ( ) = 11.

9. ½ of a foot + ( ) inches = 11 inches.

10. George and Mary share 11 oranges equally, each has ——.

11. $5\frac{1}{2} + 5\frac{1}{2} =$ ——.
12. If $a = 3\frac{1}{2}$, make 7.
13. If $b = 4\frac{1}{2}$, make 9.
14. If $c = 5\frac{1}{2}$, make 11.
15. Add at sight:



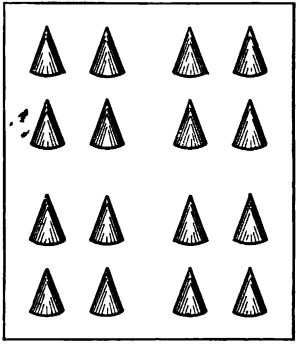
$1\frac{1}{2}$	$2\frac{1}{2}$	$3\frac{1}{2}$	$4\frac{1}{2}$	$5\frac{1}{2}$
$\underline{1\frac{1}{2}}$	$\underline{2\frac{1}{2}}$	$\underline{3\frac{1}{2}}$	$\underline{4\frac{1}{2}}$	$\underline{5\frac{1}{2}}$

OPTIONAL

1. 3 yards and 2 feet are —— feet.
2. 11 lemons are —— more than 9 lemons and —— less than a dozen lemons.
3. 6 letters and 5 letters are —— letters.
4. A tree has many leaves. 7 leaves and 4 leaves = —— leaves.
5. Make concrete examples of the 15th exercise, as, $1\frac{1}{2}$ feet and $1\frac{1}{2}$ feet are 3 feet.
6. One yard and 1 foot are —— feet.
7. 2 yards and 1 foot are —— feet.
8. 3 yards and 1 foot are —— feet.
9. 11 feet − 1 foot are —— feet.
10. 11 feet − 2 feet are —— yards.
11. 11 feet − 5 feet are —— yards.
12. 10 feet − 1 foot are —— yards.
13. 10 feet − 4 feet are —— yards.
14. 10 feet − 7 feet are —— yard.
15. 6 feet + 3 feet = —— yards.
16. 3 feet − $1\frac{1}{2}$ feet are —— feet.
17. 5 feet − $2\frac{1}{2}$ feet are —— feet.

LXV. — SIXTEEN

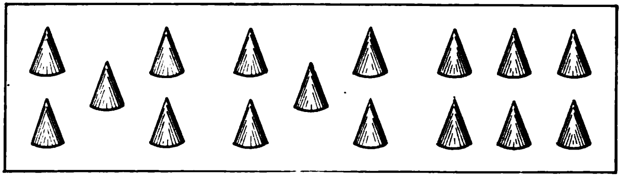
Sixteen



16

1. 8 cones + 8 cones = —— cones.
2. 10 cones + 6 cones = —— cones.
3. $\frac{1}{2}$ of 16 cones = —— cones.
4. 16 cones – 10 cones = —— cones.
5. 16 cones – 6 cones = —— cones.
6. 16 cones – 8 cones = —— cones.
7. 16 cones – 9 cones = —— cones.

Sixteen



16

8. 9 cones + 7 cones = —— cones.
9. 8 cones + 3 cones + ( ) cones = 16 cones.
10. 7 cones + 7 cones + ( ) cones = 16 cones.
11. 2 fours = ——.
12. 2 eights = ——.
13. 4 fours = ——.

14. $\frac{1}{2}$ of 16 = ——.
15. $\frac{1}{4}$ of 16 = ——.
16. 16 eggs are 1 dozen and —— eggs.
17. $\frac{2}{4}$ of 16 = ——.
18. $\frac{3}{4}$ of 16 = ——.

OPTIONAL

1. A goat has —— feet.
2. 2 goats have —— feet.
3. 3 goats have —— feet.
4. 4 goats have —— feet.
5. In a pound there are 16 ounces. In $\frac{1}{2}$ of a pound there are —— ounces.
6. In $\frac{3}{4}$ of a pound there are —— ounces.
7. Tell a story of a boy who divided 16 peaches equally among 4 friends.
8. Tell a story of a teacher who gave one girl a dozen pencils and another $\frac{1}{4}$ of a dozen pencils.

LXVI. — POUNDS AND OUNCES

Add at sight:

1. $\begin{array}{r}2\\ \underline{1}\end{array}\qquad\begin{array}{r}12\\ \underline{1}\end{array}\qquad\begin{array}{r}2\\ \underline{2}\end{array}\qquad\begin{array}{r}12\\ \underline{2}\end{array}$

2. $\begin{array}{r}2\\ \underline{3}\end{array}\qquad\begin{array}{r}12\\ \underline{3}\end{array}\qquad\begin{array}{r}2\\ \underline{4}\end{array}\qquad\begin{array}{r}12\\ \underline{4}\end{array}$

3.	3	13	3	13
	1	1	2	2
4.	3	13	4	14
	3	3	1	1
5.	4	14	5	15
	2	2	1	1

6. 2 twos = ——.
2 fours = ——.
3 twos = ——.
4 twos = ——.

7. 2 threes = ——.
2 sixes = ——.
2 fives = ——.
3 fives = ——.

8. 3 fours = ——.
3 threes = ——.
4 threes = ——.
5 twos = ——.
8 twos = ——.

9. 5 threes = ——.
4 fours = ——.
6 twos = ——.
7 twos = ——.
2 eights = ——.

10. A pound contains 16 ounces. When a pound of butter costs 14 cents, what will 8 ounces cost?

11. When sugar is 6 cents a pound, what are 8 ounces worth?

12. How many 4's in 16?

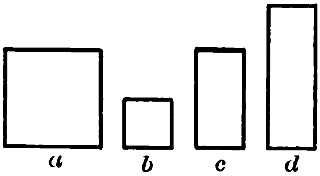
13. 4 ounces are —— —— of a pound.

14. A pound of nuts cost 12 cents. 4 ounces will cost —— cents.

15. 8 ounces will cost —— cents.

16. 12 ounces will cost —— cents.

17. If *b* is 3, how many 3's are there in each of the other units?



18. If we call *b* 3, what shall we call *a*? *c*? *d*?

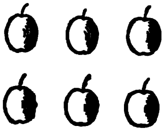
19. If we call *a* 1, what shall we call *b*? *c*? *d*?

OPTIONAL

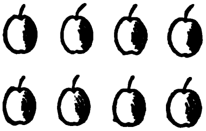
1. A dozen eggs cost 16 cents. ½ of a dozen costs —— cents.
2. At 2 cents apiece 3 oranges will cost —— cents.
3. 3 times 2 cents = —— cents.
4. 4 times 2 cents = —— cents.
5. At 2 cents apiece 5 lemons will cost —— cents.
6. 5 times 2 cents = —— cents.
7. At 2 cents apiece 6 eggs will cost —— cents.
8. 6 times 2 cents = —— cents.
9. Make concrete examples of the 2nd exercise at the beginning of this lesson.
10. A pound contains —— ounces.
11. One half of a pound is —— ounces.
12. One fourth of a pound is —— ounces.
13. Three fourths of a pound are —— ounces.

LXVII.—NUMBERS TO TWELVE

1. 2 times 3 plums = —— plums.
2. 3 times 2 plums = —— plums.
3. 4 times 2 plums = —— plums.
4. 2 times 4 plums = —— plums.



5. 6 plums – 3 plums = —— plums.
6. 6 plums – 2 plums = —— plums.



7. 8 plums – 4 plums = —— plums.
8. 6 plums + 8 plums = —— plums.
9. 3 times four peaches = —— peaches.
10. 4 times 3 peaches = —— peaches.
11. 8 peaches + 4 peaches = —— peaches.

12. 12 peaches – 4 peaches = —— peaches.
13. 12 peaches – 8 peaches = —— peaches.

14. 2 threes = ——.
3 twos = ——.
4 twos = ——.
2 fours = ——.

15. 3 fours = ——.
4 threes = ——.
4 is —— —— of 12.
3 is —— —— of 12.

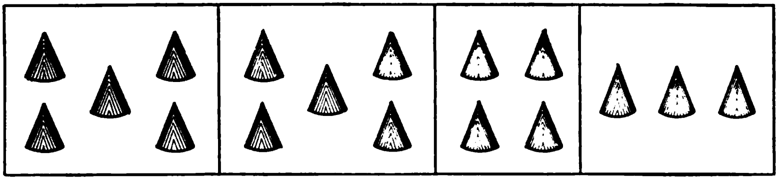
OPTIONAL

1. 6 plums at 2 cents apiece will cost —— cents.

2. 3 plums at 2 cents apiece will cost —— cents.
3. 3 plums at 3 cents apiece will cost —— cents.
4. 12 peaches at 1 cent apiece will cost —— cents.
5. 3 peaches at 4 cents apiece will cost —— cents.
6. 4 plums at 3 cents apiece will cost —— cents.
7. Make concrete examples of the 15th exercise. As, 2 apples at 3 cents each will cost 6 cents.

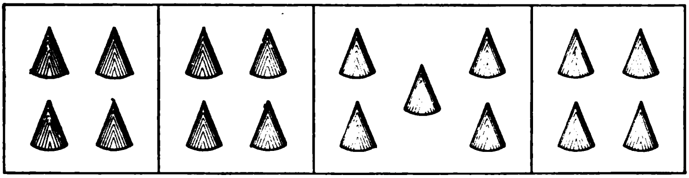
LXVIII. — SEVENTEEN

Seventeen



17

1. 10 cones + 7 cones = —— cones.
2. 11 cones + ( ) cones = 17 cones.
3. 12 cones + ( ) cones = 17 cones.
4. 13 cones + ( ) cones = 17 cones.
5. 14 cones + ( ) cones = 17 cones.
6. 15 cones + ( ) cones = 17 cones.



7. 16 cones + ( ) cone = 17 cones.
8. 9 cones + ( ) cones = 17 cones.

9. 17 cones − 7 cones = —— cones.
10. 17 cones − 6 cones = —— cones.
11. 17 cones − 5 cones = —— cones.

Add at sight:

12. $$\begin{array}{rrrr} 1 & 11 & 2 & 12 \\ \underline{6} & \underline{6} & \underline{5} & \underline{5} \end{array}$$

13. $$\begin{array}{rrrr} 3 & 13 & 4 & 14 \\ \underline{4} & \underline{4} & \underline{3} & \underline{3} \end{array}$$

14. $$\begin{array}{rrrr} 5 & 15 & 6 & 16 \\ \underline{2} & \underline{2} & \underline{1} & \underline{1} \end{array}$$

Subtract at sight:

15. $$\begin{array}{rrrr} 17 & 17 & 17 & 17 \\ \underline{1} & \underline{2} & \underline{3} & \underline{4} \end{array}$$

Copy and learn:

16. XVI = 16.
XVII = 17.

OPTIONAL

1. 17 sticks — 5 sticks = —— sticks.
2. 12 sticks + 5 sticks = —— sticks.
3. 17 birds — 1 bird = —— birds.
4. 16 birds + 1 bird = —— birds.
5. 14 birds + 3 birds = —— birds.
6. 17 birds — 3 birds = —— birds.
7. 13 birds + 4 birds = —— birds.
8. Make concrete examples of the 12th, 13th, and 14th exercises.

9. Tell a story about 17 white mice in a cage with the door left open. (See 15th exercise.)

LXIX. — HALVES, THIRDS, AND FOURTHS, REVIEW

1. $\frac{1}{2}$ of 2 = ——.
$\frac{1}{2}$ of 3 = ——.
$\frac{1}{2}$ of 4 = ——.
$\frac{1}{2}$ of 5 = ——.

2. $\frac{1}{2}$ of 6 = ——.
$\frac{1}{2}$ of 7 = ——.
$\frac{1}{2}$ of 8 = ——.
$\frac{1}{2}$ of 9 = ——.

3. $\frac{1}{2}$ of 10 = ——.
$\frac{1}{2}$ of 11 = ——.
$\frac{1}{2}$ of 12 = ——.
$\frac{1}{2}$ of 13 = ——.

4. $\frac{1}{3}$ of 6 = ——.
$\frac{1}{3}$ of 9 = ——.
$\frac{2}{3}$ of 6 = ——.
$\frac{2}{3}$ of 9 = ——.

5. $\frac{1}{3}$ of 12 = ——.
$\frac{1}{4}$ of 12 = ——.
$\frac{2}{3}$ of 12 = ——.
$\frac{3}{4}$ of 12 = ——.

6. $\frac{1}{4}$ of 8 = ——.
$\frac{3}{4}$ of 8 = ——.
$\frac{1}{2}$ of 14 = ——.
$\frac{1}{2}$ of 15 = ——.

7. $\frac{1}{3}$ of 15 = ——.
$\frac{2}{3}$ of 15 = ——.
$\frac{1}{2}$ of 16 = ——.
$\frac{1}{4}$ of 16 = ——.

8. $\frac{2}{4}$ of 16 = ——.
$\frac{3}{4}$ of 16 = ——.
$\frac{1}{2}$ of 17 = ——.

9. $\frac{1}{2}$ of a foot = —— inches.
$\frac{1}{3}$ of a foot = —— inches.
$\frac{2}{3}$ of a foot = —— inches.
$\frac{1}{4}$ of a foot = —— inches.

10. $\frac{2}{4}$ of a foot = —— inches.
$\frac{3}{4}$ of a foot = —— inches.

$\frac{4}{4}$ of a foot = —— inches.
$\frac{1}{2}$ of a week = —— days.

11. $\frac{1}{2}$ of a yard = —— feet.
$\frac{1}{3}$ of a yard = —— foot.
$\frac{2}{3}$ of a yard = —— feet.
$\frac{3}{3}$ of a yard = —— feet.

12. $\frac{1}{2}$ of a pound = —— ounces.
$\frac{1}{4}$ of a pound = —— ounces.
$\frac{2}{4}$ of a pound = —— ounces.
$\frac{3}{4}$ of a pound = —— ounces.

13. Make concrete examples of the 6th and 7th exercises. As, $\frac{1}{4}$ of 8 books are 2 books, $\frac{1}{3}$ of 15 turnips are 5 turnips.

OPTIONAL

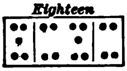
1. $\frac{1}{2}$ of a foot + $\frac{1}{4}$ of a foot = —— inches.
2. $\frac{1}{2}$ of a foot + $\frac{1}{3}$ of a foot = —— inches.
3. $\frac{1}{4}$ of a foot + $\frac{1}{3}$ of a foot = —— inches.
4. $\frac{1}{4}$ of a foot + $\frac{2}{3}$ of a foot = —— inches.
5. 1 foot + 3 inches = —— inches.
6. 1 foot − 3 inches = —— inches.

7. Tell a story of a plant 1 foot high that grew 5 inches higher.

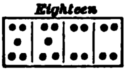
8. Tell a story of a rosebush 15 inches high, which had 3 inches broken off.

9. Tell a story of a ruler 14 inches long becoming 1 foot in length.

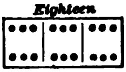
LXX. — EIGHTEEN



18



18



18

1. $9 + 9 =$ ——.
2. $6 + 6 + 6 =$ ——.
3. 3 sixes = ——.
4. $\frac{1}{2}$ of 18 = ——.
5. 3 threes = ——.
6. $\frac{1}{3}$ of 18 = ——.

Add at sight, supplying the missing numbers:

7. $$\begin{array}{rrrr} 11 & 12 & 13 & 14 \\ 7 & & & \\ \hline & 18 & 18 & 18 \end{array}$$

8. $$\begin{array}{rrrr} 15 & 16 & 17 & 7 \\ & & & 1 \\ \hline 18 & 18 & 18 & \end{array}$$

9. $$\begin{array}{rrrr} 2 & 12 & 3 & 13 \\ 6 & 6 & 5 & 5 \\ \hline \end{array}$$

10. $$\begin{array}{rrrr} 4 & 14 & 5 & 15 \\ 4 & 4 & 3 & 3 \\ \hline \end{array}$$

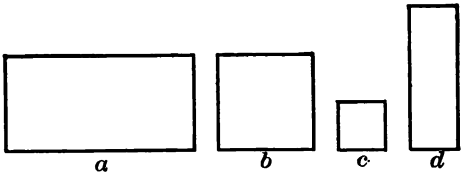
11. $$\begin{array}{rrrr} 6 & 16 & 2 & 12 \\ 2 & 2 & 3 & 3 \\ \hline \end{array}$$

12. 2 nines = ——.
$\frac{2}{3}$ of 18 = ——.
1 dozen + $\frac{1}{2}$ of a dozen = ——.
18 contains —— threes.

13. 18 = ( ) nines. 18 = ( ) sixes.
18 = ( ) threes. 18 = ( ) dozen.

14. If *c* is 2, how many 2's are there in each of the other units?

15. If we call *c* 2, what shall we name *d*? *b*? *a*?



16. If *b* is 1, what is *a*? *c*? *d*?

17. Make concrete examples of Exercises 1–7. As, 9 horses in a field and 9 horses in the barn make 18 horses in all.

OPTIONAL

1. A man having 18 sheep sold 3 of them to one person and 6 of them to another. He had —— sheep left.

2. A farmer having 16 cows sold $\frac{1}{4}$ of them. He had —— cows left.

3. A boy having 15 marbles lost $\frac{1}{3}$ of them. He had —— marbles left.

4. A girl having 12 cents received $\frac{1}{3}$ as many more. She then had —— cents.

5. A boy having 15 cherries gave $\frac{2}{3}$ of them to his mother. He then had —— cherries.

6. Tell a story of a man having 11 horses and getting more until he had 18.

LXXI. — MAGNITUDES AND DRILL IN ADDITION

Add at sight, then copy and add:

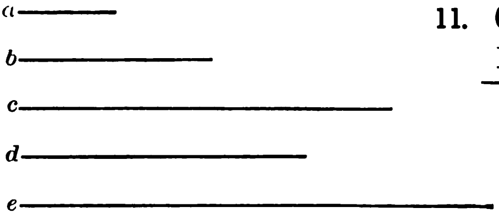
1.	1	2	2	**2.**	5	7	3
	2	3	1		1	2	1
	3	4	4		4	1	5

3.	3	4	8	**4.**	3	2	5
	2	3	1		2	2	1
	5	3	1		4	2	2

5.	3	5	4	**6.**	2	5	3
	4	1	3		2	1	2
	2	5	2		3	2	4
					3	1	1

7.	1	2	6	**8.**	2	3	1
	2	2	1		1	3	2
	3	5	4		4	2	3
	1	2	1		2	3	4

9.	3	13	4	14	**10.**	5	15	6	16
	5	5	4	4		3	3	2	2



11. $$\begin{array}{r}6\\1\\\hline\end{array}\quad\begin{array}{r}16\\1\\\hline\end{array}\quad\begin{array}{r}7\\1\\\hline\end{array}\quad\begin{array}{r}17\\1\\\hline\end{array}$$

12. If *a* is 2, how many 2's are there in each of the other units?

13. If *a* is 2, what shall we call each of the other units?

14. If *a* is 3, how many 3's in each of the other units?

15. If *a* is 3, what shall we call each of the other units?

16. If *a* is ½, what shall we call each of the other units?

17. Make concrete examples of the first and second exercises. As, I have 1 marble in my hand, 2 in my cap, and 3 in my pocket. I have 6 marbles in all.

OPTIONAL

1. A geranium 1 foot high grew 6 inches higher. It was then ——— inches high.

2. The tail of John's kite was 3 yards long. A piece 4 feet long was torn off in a tree. The tail was then only ——— feet long.

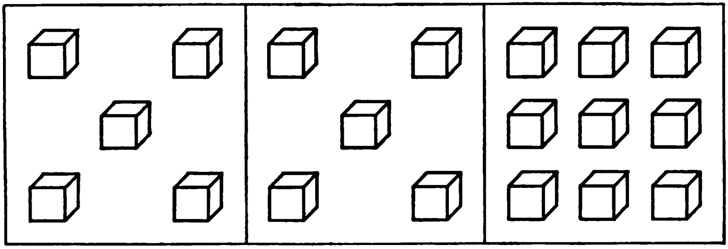
3. John then added 1 yard to the tail, making it —— feet long.

4. Tell a story of a kite which once had a tail 10 feet long.

5. Tell a story of a string 16 feet long broken by a kitten in play.

LXXII. — NINETEEN

Nineteen



19

1. 10 cubes + 9 cubes = —— cubes.
2. 11 cubes + ( ) cubes = 19 cubes.
3. 12 cubes + ( ) cubes = 19 cubes.
4. 13 cubes + ( ) cubes = 19 cubes.
5. 14 cubes + ( ) cubes = 19 cubes.
6. 15 cubes + ( ) cubes = 19 cubes.
7. 16 cubes + ( ) cubes = 19 cubes.
8. 17 cubes + ( ) cubes = 19 cubes.
9. 18 cubes + ( ) cube = 19 cubes.
10. 19 cubes − 1 cube = —— cubes.
11. 19 cubes − 2 cubes = —— cubes.

Add at sight:

12. $\begin{array}{r}7\\ \underline{2}\end{array}\quad\begin{array}{r}17\\ \underline{2}\end{array}\quad\begin{array}{r}6\\ \underline{3}\end{array}\quad\begin{array}{r}16\\ \underline{3}\end{array}$ **13.** $\begin{array}{r}5\\ \underline{4}\end{array}\quad\begin{array}{r}15\\ \underline{4}\end{array}\quad\begin{array}{r}4\\ \underline{5}\end{array}\quad\begin{array}{r}14\\ \underline{5}\end{array}$

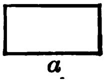
14. $\begin{array}{r}3\\ \underline{6}\end{array}\quad\begin{array}{r}13\\ \underline{6}\end{array}\quad\begin{array}{r}2\\ \underline{7}\end{array}\quad\begin{array}{r}12\\ \underline{7}\end{array}$

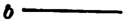
15. $\begin{array}{r}1\\ \underline{8}\end{array}\quad\begin{array}{r}1\\ \underline{18}\end{array}$

3 sixes + 1 = ——.
2 tens − 1 = ——.
2 nines + 1 = ——.

16. Make concrete examples of the 10th and 11th exercises.

17. If *a* is a 6, make a 12.





18. Make an 18.

19. Make a 3.

20. If *b* is a 3, make a 6.

21. Make a 9; a 12; a 15; an 18.

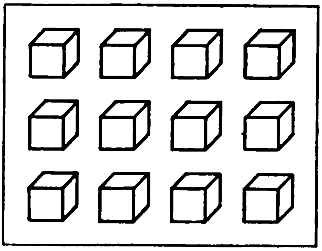
OPTIONAL

1. If you place 4 beans in a row, and have 4 such rows, you will have —— beans.
2. You will need —— more beans to make 19 beans.
3. By placing 4 beans in a row and making 5 rows, you will have —— beans.
4. Remove 1 bean, and you will have —— beans left.

5. 5 fours − 1 = ——.

6. Tell a story of 3 boys and a girl carrying 19 eggs, the girl carrying only one.

LXXIII. — TWELVE, COUNTING BY TENS TO 100



1. There are —— cubes in the top row. There are —— such rows.

2. There are —— cubes in all.

3. 3 times 4 cubes = —— cubes.

4. 4 cubes × 3 = —— cubes.

NOTE. — The sign (×) is here read "*multiplied by*."

5. $\frac{1}{3}$ of 12 cubes = —— cubes.

6. There are —— cubes in the left-hand column. There are —— such columns.

7. 4 times 3 cubes = —— cubes.

8. 3 cubes × 4 = —— cubes.

9. $\frac{1}{4}$ of 12 cubes = —— cubes.

10. At 20 cents a dozen, 6 cubes would cost —— cents.

11. 4 cubes are —— —— of a dozen cubes.

12. At 15 cents a dozen, 4 cubes would cost —— cents.

13. 3 cubes are —— —— of a dozen cubes.

14. At 16 cents a dozen, 3 cubes would cost —— cents.

15. Beginning at 10 count by 10's to 100. Thus, 10, 20, 30, etc.

16. Beginning at 11 count by 10's to 91. Thus, 11, 21, 31, etc.

17. Beginning at 12 count by 10's to 92.

18. 2 tens and one = 21.
2 tens and two = ——.
2 tens and three = ——.
Etc.
2 tens and nine = ——.
3 tens = ——.

OPTIONAL

1. A man bought $\frac{1}{2}$ of a pound of candy. How many ounces?

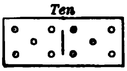
2. It cost him 10 cents. He would have paid —— cents for a pound.

3. For $\frac{1}{4}$ of a pound he would have paid —— cents.

4. At 16 cents a dozen 6 eggs would cost —— cents, and 3 eggs would cost —— cents.

5. Make a story to fit this: 4 times 5 cents = 20 cents.

LXXIV. — TENS, ROMAN SYSTEM, XVIII–XX



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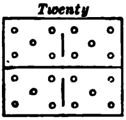

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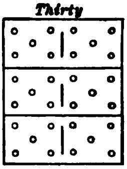


30

1. 2 tens are ——.
   3 tens are ——.
   4 tens are ——.
   5 tens are ——.

2. 6 tens are ——.
   Etc.
   10 tens are ——.

3. 2 tens and 1 = ——.
   3 tens and 1 = ——.
   3 tens and 2 = ——.
   4 tens and 1 = ——.
   4 tens and 2 = ——.

4. 5 tens and 3 = ——.
   1 ten and 1 = ——.
   2 tens and 2 = ——.
   3 tens and 3 = ——.
   4 tens and 4 = ——.

5. Copy and learn:

1 2 3 4 5 6 7 8 9 10
11 12 13 14 15 16 17 18 19 20

6. Copy and learn: XVIII = 18.
XIX = 19.
XX = 20.

OPTIONAL

1. Butter costs 40 cents a pound. $\frac{1}{4}$ of a pound costs —— cents.

2. $\frac{1}{2}$ of a pound costs —— cents.

3. $\frac{3}{4}$ of a pound cost —— cents.

4. If 4 marbles cost 3 cents, 8 marbles would cost —— cents.

5. 8 = ( ) times 4.

6. If 4 eggs cost 5 cents, 12 eggs would cost —— cents.

7. 12 = ( ) times 4.

8. Make a story suggested by this: 3 times 3 cents = 9 cents.

LXXV.—ADDITION, SUBTRACTION, MAGNITUDES

First orally, then write; add:

1.
$$\begin{array}{rrcr} 10 & 10 & \text{and so on to} & 10 \\ \underline{1} & \underline{2} & & \underline{10} \end{array}$$

2.
$$\begin{array}{rrcr} 20 & 20 & \text{and so on to} & 20 \\ \underline{1} & \underline{2} & & \underline{10} \end{array}$$

Add at sight:

3.
$$\begin{array}{rrrr} 1 & 1 & 1 & 1 \\ \underline{2} & \underline{12} & \underline{22} & \underline{32} \end{array}$$

4.
$$\begin{array}{rrrr} 2 & 2 & 2 & 2 \\ \underline{2} & \underline{12} & \underline{22} & \underline{32} \end{array}$$

5.	3	3	3	3
	2	12	22	32

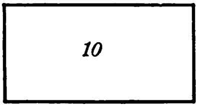
6. Mary paid 13 cents for a slate and 2 cents for a pencil. For both she paid —— cents.

7. Jane sold her ruler for 10 cents and her knife for 9 cents. For both she received —— cents.

8. John paid 10 cents for a knife and 5 cents for a penholder. For both he paid —— cents.

9. James paid 3 cents for a pencil, 1 cent for a pen, and 5 cents for some paper. In all he paid —— cents.

10. A girl having 12 cents, paid 2 cents for a pencil, 3 cents for some pins, and 4 cents for a comb. How much had she left?

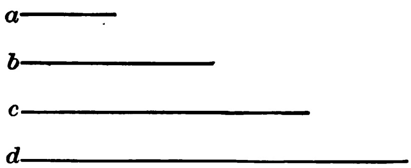


11. If this is a 10, make a 5; a 15; a 20.

12. If a 10 is worth 4 cents, what is a 5 worth? a 15? a 20?

OPTIONAL

1. Draw a line as long as *a*, *b*, and *c* together.
2. Draw a line as long as *c* and *d* together.
3. If *a* is 4, what is *b*? *c*? *d*?



4. If *b* is 6, what is *a*? *c*? *d*?

5. If *a* is 3, what is the sum of *a* and *b*? Of *b* and *c*? (Add.)

6. *a* and *b* are equal to which line? *a* and *c*?

7. Make a story suggestive by this exercise: 5 cents + 2 cents = 7 cents.

LXXVI. — TENS AND UNITS, ADDITION AND SUBTRACTION

Orally.

1. 16 is —— ten and ——.
26 is —— tens and ——.
36 is —— tens and ——.
46 is —— tens and ——.
47 is —— tens and ——.
57 is —— tens and ——.
39 is —— tens and ——.
54 is —— tens and ——.
67 is —— tens and ——.
77 is —— tens and ——.
84 is —— tens and ——.

Add at sight:

2. $\begin{array}{r}13\\ \underline{1}\end{array}$ $\begin{array}{r}23\\ \underline{1}\end{array}$ $\begin{array}{r}33\\ \underline{1}\end{array}$ $\begin{array}{r}53\\ \underline{1}\end{array}$

3. $\begin{array}{r}4\\ \underline{2}\end{array}$ $\begin{array}{r}14\\ \underline{2}\end{array}$ $\begin{array}{r}24\\ \underline{2}\end{array}$ $\begin{array}{r}34\\ \underline{2}\end{array}$

4. $\begin{array}{rrrr} 5 & 15 & 25 & 35 \\ 2 & 2 & 2 & 2 \\ \hline \end{array}$

5. $\begin{array}{rrrr} 13 & 23 & 33 & 43 \\ 2 & 2 & 2 & 2 \\ \hline \end{array}$

6. John had 27 cents and his father gave him 2 more. He then had —— cents.

7. Mary bought a book for 23 cents and a book for 3 cents. For both she paid —— cents.

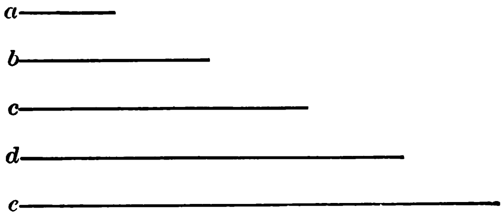
8. Jane paid 31 cents for a knife and 7 cents for a comb. For both she paid —— cents.

9. A farmer paid $4 for a sheep and $3 for a lamb. For both he paid —— dollars.

10. A woman bought 2 yards of cloth at 1 dollar a yard, and 3 pounds of brook trout at 1 dollar a pound. For both she paid —— dollars.

11. Make concrete examples of the 2nd and 3rd exercises.

OPTIONAL



1. If *c* is 9, what is *a*? *b*? *d*? *e*?
2. How much longer is *c* than *b*?
3. How much longer is *d* than *c*?
4. How much longer is *e* than *c*?

5. How much longer is *d* than *b*?
6. What is the sum of *b* and *c*?
7. What is the sum of *d* and *e*?

8. Tell a story suggested by this exercise: 5 times 3 = 15.

9. Tell a story suggested by this exercise: 3 times 6 = 18.

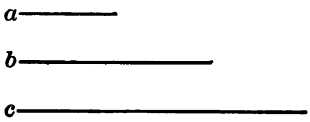
LXXVII. — ADDITION, MAGNITUDES, COUNTING BY ONES

The teacher should give this lesson orally at first, the pupil filling in orally without the book. Then the pupil, with the book, should copy the addition exercises in full

Add:

1.	13	23	33	53	63	2.	14	24	34	64	74
	2	2	2	2	2		3	3	3	3	3
3.	15	25	35	75	45	4.	13	43	23	83	93
	3	3	3	3	3		3	3	3	3	3
5.	6	16	26	46	66	6.	7	17	27	57	97
	3	3	3	3	3		3	3	3	3	3
7.	8	78	68	88	98	8.	9	69	79	89	99
	2	2	2	2	2		1	1	1	1	1

9. Count from 1 to 100. (Not to be written.)

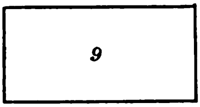


10. If a is $\frac{1}{2}$, what is b? What is c?

11. If c is 6, what is b? What is a?

12. If a is $\frac{1}{3}$, what is b? What is c?

OPTIONAL



1. If this is a 9, make an 18.
2. Make a 3.
3. Make a 6.
4. Make a 12. (These may be drawn on paper, then cut out.)
5. Tell a story using the numbers 18 and $\frac{1}{8}$.
6. Tell a story using the numbers 16 and $\frac{3}{4}$.

LXXVIII.—ADDITION, COUNTING BY 2'S FROM 2

First orally without the book, then copy in full
See note in Lesson LXXVII

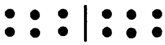
Add:

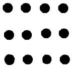
1.	1	11	21	31	41	2.	2	12	22	32	42
	4	4	4	4	4		4	4	4	4	4
3.	3	13	23	33	43	4.	1	11	51	61	71
	4	4	4	4	4		5	5	5	5	5
5.	2	12	52	62	72	6.	3	13	63	73	83
	5	5	5	5	5		5	5	5	5	5

7. $\begin{array}{r} 4 \\ 5 \\ \hline \end{array}$ $\begin{array}{r} 14 \\ 5 \\ \hline \end{array}$ $\begin{array}{r} 74 \\ 5 \\ \hline \end{array}$ $\begin{array}{r} 84 \\ 5 \\ \hline \end{array}$ $\begin{array}{r} 94 \\ 5 \\ \hline \end{array}$

8. $\begin{array}{r} 5 \\ 5 \\ \hline \end{array}$ $\begin{array}{r} 15 \\ 5 \\ \hline \end{array}$ $\begin{array}{r} 75 \\ 5 \\ \hline \end{array}$ $\begin{array}{r} 85 \\ 5 \\ \hline \end{array}$ $\begin{array}{r} 95 \\ 5 \\ \hline \end{array}$

9. Beginning at 2, count by 2's to 36. Thus, 2, 4, 6, etc. (Not to be written.)





10. How many 6's in a dozen? How many 2's?

11. How many 4's in a dozen? How many 3's?

NOTE. — Intense interest can be aroused by allowing pupils to count as far as possible in, say, one minute. A pupil may keep the record made. Give each an opportunity to lower his record at a future recitation. The results will prove most gratifying.

OPTIONAL

1. A girl received 4 cookies, then 3 cookies, then 2 cookies, and then she gave 5 cookies away. She had —— cookies left.

2. One week a white hen laid 6 eggs, a black hen laid 5 eggs, and a speckled hen laid 4 eggs. A little boy broke 2 of the eggs by accident. There were —— eggs left.

3. $6 + 4 + 2 - 5 =$ 5. $5 + 4 + 4 - 3 =$
4. $5 + 3 + 4 - 5 =$ 6. $5 + 2 + 5 - 7 =$
7. Make a concrete example of the 3rd exercise.
8. Make a concrete example of the 4th exercise.

LXXIX.—ADDITION, COUNTING BY 2'S FROM 1

First orally without the book, then copy in full
See note in Lesson LXXVII

Add:

1.	4	14	74	84	94	**2.**	5	15	75	85	95
	4	4	4	4	4		4	4	4	4	4
3.	16	26	36	46	56	**4.**	16	26	36	46	56
	4	4	4	4	4		5	5	5	5	5
5.	27	17	7	47	57	**6.**	8	18	38	78	88
	5	5	5	5	5		5	5	5	5	5
7.	8	18	28	38	48	**8.**	9	19	29	79	89
	4	4	4	4	4		5	5	5	5	5
9.	9	19	29	79	39	**10.**	37	57	67	77	87
	4	4	4	4	4		4	4	4	4	4

11. Beginning at 1, count by 2's to 35. Thus, 1, 3, 5, etc. (Not to be written.)

12. If *a* is $\frac{1}{2}$, make 1; make 2; make 3; make 4.

13. If *a* is $\frac{1}{4}$, make 1; make 2; make 3; make 4. $\overset{a}{\overline{}}$

OPTIONAL

1. Mother bought one loaf of bread on Monday, one on Tuesday, and one on Wednesday. At 7 cents a loaf, they cost her —— cents.

2. A woman bought 1 quart of milk on Monday, 1 quart on Tuesday, and one quart on Wednesday. At 8 cents a quart, the milk cost her —— cents.

3. From 20 cents, a boy paid 5 cents for candy and 2 cents for gum. He had —— cents left.

4. Make concrete examples of the 5th and 6th exercises.

5. A boy who had 9 pencils in his pocket received 4 more from his mother. He then had —— pencils.

6. 4 years ago a young man was 19 years of age. He is now — — years old.

7. John is 7 years old. In 5 years he will be —— years old.

LXXX.—ADDITION, COUNTING BY 3'S FROM 3

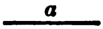
First orally without the book, then copy in full
See note in Lesson LXXVII

Add:

1.	1	11	21	31	41	2.	2	12	22	32	42
	6	6	6	6	6		6	6	6	6	6
3.	3	13	23	33	43	4.	4	14	54	64	74
	6	6	6	6	6		6	6	6	6	6
5.	5	15	25	35	45	6.	55	65	75	85	95
	6	6	6	6	6		6	6	6	6	5
7.	6	16	26	36	46	8.	56	66	76	86	96
	6	6	6	6	6		6	6	6	6	4
9.	7	17	27	37	47	10.	57	67	77	87	97
	6	6	6	6	6		6	6	6	6	2

11. Beginning at 3, count by 3's to 36. (Not to be written.)

12. If a is $\frac{1}{3}$, make 1; 2; 3; 4.



13. If a is $\frac{2}{3}$, make $\frac{1}{3}$.

OPTIONAL

1. A man worked 4 days at $2 a day. He earned —— dollars.

2. 4 times $2 = —— dollars.

3. A mason worked 3 days at $4 a day. He earned —— dollars.

4. 3 times $4 = —— dollars.

5. For 3 days' work a man received $6. Each day he earned —— dollars.

6. $\frac{1}{3}$ of $6 = —— dollars.

7. Make concrete examples of the 8th and 9th exercises.

LXXXI. — ADDITION, COUNTING BY 3'S FROM 2

First orally without the book, then copy in full
See note in Lesson LXXVII

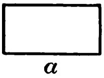
Add:

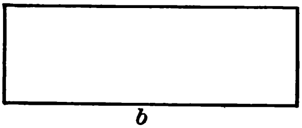
1.	9	19	29	39	49	2.	59	69	79	89	99
	6	6	6	6	6		6	6	6	6	1
3.	1	11	21	31	41	4.	2	12	22	32	42
	7	7	7	7	7		7	7	7	7	7
5.	3	13	23	33	43	6.	4	14	24	34	44
	7	7	7	7	7		7	7	7	7	7

7.	54	64	74	84	94	8.	5	15	25	35	45
	7	7	7	7	5		7	7	7	7	7
9.	55	65	75	85	95	10.	6	16	26	36	46
	7	7	7	7	4		7	7	7	7	7
11.	56	66	76	86	96						
	7	7	7	7	3						

12. Beginning at 2, count by 3's to 35. (Not to be written.)

13. Draw a rectangle equal to both *a* and *b* together.



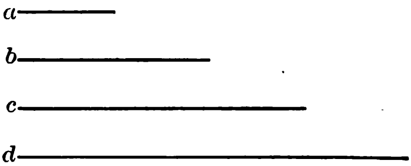


14. If *a* is 3, what are *a* and *b* together?

15. If a rectangle equal to *a* be cut from the end of *b*, what is the remainder? ($a = 3$.)

OPTIONAL

1. If $b = \frac{1}{2}$, what is *a* equal to?
2. What is *c* equal to?
3. What is *d* equal to?
4. *a* equals —— —— of *d*.
5. *b* equals —— —— of *d*.



6. *a* and *b* together equal which line?
7. $c =$ —— fourths.
8. $\frac{1}{2}$ and $\frac{1}{4}$ together equal —— fourths.

LXXXII. — ADDITION, COUNTING BY 3'S FROM 1, PINT, QUART

First orally without the book, then copy in full
See note in Lesson LXXVII

Add:

1.	7	17	27	37	47	2.	57	67	77	87	97
	7	7	7	7	7		7	7	7	7	3
3.	8	18	28	38	48	4.	58	68	78	88	98
	7	7	7	7	7		7	7	7	7	2
5.	9	19	29	39	49	6.	59	69	79	89	99
	7	7	7	7	7		7	7	7	7	1
7.	1	11	21	31	41	8.	2	12	22	32	42
	8	8	8	8	8		8	8	8	8	8
9.	3	13	23	33	43	10.	53	63	73	83	93
	8	8	8	8	8		8	8	8	8	6

11. Beginning at 1, count by 3's to 34. (Not to be written.)

NOTE. — Allow the pupils to see by actual test that a quart measure holds as much as 2 pint measures.

1 pint

1 quart

12. If milk is worth 4 cents a pint, what is it worth a quart?

13. If milk is worth 10 cents a quart, what is it worth a pint?

OPTIONAL

1. A mother found 1 knife, 3 strings, 7 marbles, and 2 cents in her boy's pocket. In all she found —— articles.

2. A father gave his son 20 cents. The boy paid 2 cents for an apple, 7 cents for some candy, and 7 cents for some marbles. He had —— cents left.

3. A boy with his pocket full of plums, gave 3 plums to Emma, 7 to George, 4 to Ethel, and 5 to Henry. As he then had only 2 plums left, he must have had —— plums at first.

4. Make concrete examples of the 4th and 5th exercises.

LXXXIII. — ADDITION, COUNTING BY 4'S FROM 4

First orally without the book, then copy in full
See note in Lesson LXXVII

Add:

1.	4	14	24	34	44	**2.**	54	64	74	84	94
	8	8	8	8	8		8	8	8	8	6
3.	5	15	25	35	45	**4.**	55	65	75	85	95
	8	8	8	8	8		8	8	8	8	5

$$5.\ \begin{array}{r}6\\ \underline{8}\end{array}\quad\begin{array}{r}16\\ \underline{8}\end{array}\quad\begin{array}{r}26\\ \underline{8}\end{array}\quad\begin{array}{r}36\\ \underline{8}\end{array}\quad\begin{array}{r}46\\ \underline{8}\end{array}\qquad 6.\ \begin{array}{r}56\\ \underline{8}\end{array}\quad\begin{array}{r}66\\ \underline{8}\end{array}\quad\begin{array}{r}76\\ \underline{8}\end{array}\quad\begin{array}{r}86\\ \underline{8}\end{array}\quad\begin{array}{r}96\\ \underline{4}\end{array}$$

$$7.\ \begin{array}{r}7\\ \underline{8}\end{array}\quad\begin{array}{r}17\\ \underline{8}\end{array}\quad\begin{array}{r}27\\ \underline{8}\end{array}\quad\begin{array}{r}37\\ \underline{8}\end{array}\quad\begin{array}{r}47\\ \underline{8}\end{array}\qquad 8.\ \begin{array}{r}57\\ \underline{8}\end{array}\quad\begin{array}{r}67\\ \underline{8}\end{array}\quad\begin{array}{r}77\\ \underline{8}\end{array}\quad\begin{array}{r}87\\ \underline{8}\end{array}\quad\begin{array}{r}97\\ \underline{3}\end{array}$$

$$9.\ \begin{array}{r}8\\ \underline{8}\end{array}\quad\begin{array}{r}18\\ \underline{8}\end{array}\quad\begin{array}{r}28\\ \underline{8}\end{array}\quad\begin{array}{r}38\\ \underline{8}\end{array}\quad\begin{array}{r}48\\ \underline{8}\end{array}\qquad 10.\ \begin{array}{r}58\\ \underline{8}\end{array}\quad\begin{array}{r}68\\ \underline{8}\end{array}\quad\begin{array}{r}78\\ \underline{8}\end{array}\quad\begin{array}{r}88\\ \underline{8}\end{array}\quad\begin{array}{r}98\\ \underline{2}\end{array}$$

11. Beginning at 4, count by 4's to 36. (Not to be written.)

12. If a pint of milk cost 4 cents, what will 4 pints cost?

13. If a pint of milk cost 4 cents, what will a quart cost?

14. 2 quarts = —— pints.
3 quarts = —— pints.
4 quarts = —— pints.
5 quarts = —— pints.
6 quarts = —— pints.

15. 2 pints = —— quart.
6 pints = —— quarts.
8 pints = —— quarts.
12 pints = —— quarts.
14 pints = —— quarts.

16. Find the cost of 2 quarts of milk at 3 cents a pint.

17. 3 quarts of milk at 3 cents a pint will cost —— cents.

18. 4 pints of milk at 6 cents a quart will cost —— cents.

OPTIONAL

1. In 6 feet there are —— yards.
2. In 9 feet there are —— yards.
3. In 12 feet there are —— yards.
4. In 15 feet there are —— yards.
5. 18 ft. = —— yd.
6. 21 ft. = —— yd.
7. 24 ft. = —— yd.

(Feet = ft. Yard = yd.)

8. Tell a story about a string 4 yd. long having 2 ft. cut off.

9. Tell a story about 2 yd. wire worth 2 cents a foot.

LXXXIV. — ADDITION, COUNTING BY 4'S FROM 3

First orally without the book, then copy in full
See note in Lesson LXXVII

Add:

1.	1	11	21	31	41	2.	51	61	71	81	91
	9	9	9	9	9		9	9	9	9	9
3.	2	12	22	32	42	4.	52	62	72	82	92
	9	9	9	9	9		9	9	9	9	7

5.	3	13	23	33	43	6.	44	54	64	74	84
	9	9	9	9	9		9	9	9	9	9
7.	53	63	73	83	93	8.	4	14	24	34	94
	9	9	9	9	9		9	9	9	9	6
9.	5	15	25	35	45	10.	55	65	75	85	95
	9	9	9	9	9		9	9	9	9	5

11. Beginning at 3, count by 4's to 35. (Not to be written.)

OPTIONAL

1. $\frac{1}{2}$ of 12 + $\frac{1}{3}$ of 15 =
2. $\frac{1}{2}$ of 16 + $\frac{1}{3}$ of 18 =
3. $\frac{1}{3}$ of 9 + $\frac{1}{2}$ of 4 =
4. $\frac{1}{3}$ of 12 + $\frac{1}{2}$ of 8 =
5. 1 dozen and 5 =
6. 1 dozen and 6 =
7. 1 dozen less 3 =
8. 1 dozen less 4 =
9. Tell a story suggested by the sixth example.
10. Tell a story suggested by the seventh example.

LXXXV. — ADDITION, COUNTING BY 4'S FROM 2

First orally without the book, then copy in full
See Lesson LXXVII

Add:

1.	6	16	26	36	46	2.	56	66	76	86	96
	9	9	9	9	9		9	9	9	9	4
3.	7	17	27	37	47	4.	57	67	77	87	97
	9	9	9	9	9		9	9	9	9	2

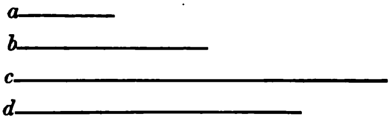
5.	8	18	28	38	48	**6.**	58	68	78	88	98
	9	9	9	9	9		9	9	9	9	1

7.	9	19	29	39	49	**8.**	59	69	79	89	99
	9	9	9	9	9		9	9	9	9	1

9.	24	34	44	84	94	**10.**	7	17	27	47	97
	6	6	6	6	6		4	4	4	4	2

11. Beginning at 2, count by 4's to 34. (Not to be written.)

12. Beginning at 5, count by 5's to 35.



13. If from *c* you take away a part equal to *d*, the part left will be equal to which line?

14. If from *c* you take away a part equal to *b*, the part left will be equal to which line?

15. If from *d* you take away a part equal to *a*, the part left will be equal to which line?

16. If $a = 2$, *b* equals what? *c*? *d*?

17. $c - d$ equals what?

18. $c - b$ equals what?

19. $d - a$ equals what?

OPTIONAL

1. If we call c 12, what may we call b? a? d?

2. What is the sum of a and d?

3. What is the difference between d and a? That is, if a part of d equal to a be taken away, what may we call the part left?

4. What may we call the difference between c and a?

5. What may we call the difference between c and b?

6. Tell a story of a boy having 15 marbles and losing a few at a time till he had only 5 left.

LXXXVI.—SUBTRACTION, COUNTING BY 4'S FROM 1, BY 5'S FROM 4

1. 2 inches − 1 inch = —— inch.
12 inches − 1 inch = —— inches.
22 inches − 1 inch = —— inches.
32 inches − 1 inch = —— inches.
42 inches − 1 inch = —— inches.

2. 3 inches − 1 inch = —— inches.
13 inches − 1 inch = —— inches.
23 inches − 1 inch = —— inches.
33 inches − 1 inch = —— inches.
43 inches − 1 inch = —— inches.

3. 3 inches − 2 inches = —— inches.
13 inches − 2 inches = —— inches.
23 inches − 2 inches = —— inches.
33 inches − 2 inches = —— inches.
43 inches − 2 inches = —— inches.

4. 4 inches − 2 inches = —— inches.
14 inches − 2 inches = —— inches.
24 inches − 2 inches = —— inches.
34 inches − 2 inches = —— inches.
44 inches − 2 inches = —— inches.

5. 5 feet − 2 feet = —— feet.
15 feet − 2 feet = —— feet.
25 feet − 2 feet = —— feet.
35 feet − 2 feet = —— feet.
45 feet − 2 feet = —— feet.

6. 6 fans − 2 fans = —— fans.
16 fans − 2 fans = —— fans.
26 fans − 2 fans = —— fans.
36 fans − 2 fans = —— fans.
46 fans − 2 fans = —— fans.

7. 6 fans − 3 fans = —— fans.
16 fans − 3 fans = —— fans.
26 fans − 3 fans = —— fans.
36 fans − 3 fans = —— fans.
46 fans − 3 fans = —— fans.

8. 6 feet − 4 feet = —— feet.
16 feet − 4 feet = —— feet.
26 feet − 4 feet = —— feet.
36 feet − 4 feet = —— feet.
46 feet − 4 feet = —— feet.

Subtract:

9.

$$\begin{array}{ccccc} 2 & 12 & 22 & 32 & 42 \\ \underline{1} & \underline{1} & \underline{1} & \underline{1} & \underline{1} \end{array}$$

10.

$$\begin{array}{ccccc} 3 & 13 & 23 & 33 & 43 \\ \underline{2} & \underline{2} & \underline{2} & \underline{2} & \underline{2} \end{array}$$

11.

$$\begin{array}{ccccc} 4 & 14 & 24 & 34 & 44 \\ \underline{2} & \underline{2} & \underline{2} & \underline{2} & \underline{2} \end{array}$$

12.

$$\begin{array}{ccccc} 5 & 15 & 25 & 35 & 45 \\ \underline{2} & \underline{2} & \underline{2} & \underline{2} & \underline{2} \end{array}$$

13. Make concrete examples of the 11th and 12th exercises.

14. Beginning at 1, count by 4's to 33. (Not to be written.)

15. Beginning at 4, count by 5's to 34.

OPTIONAL

1. 1 ft. = —— inches. 2 ft. = —— inches.
2. $1\frac{1}{2}$ ft. = —— inches. $1\frac{1}{3}$ ft. = —— inches.
3. 1 yd. = —— ft. $\frac{1}{2}$ yd. = —— ft.
4. $1\frac{1}{2}$ yd. = —— ft.
5. Tell a story of $1\frac{1}{2}$ dozen eggs worth 20 cents a dozen.
6. Tell a story of $2\frac{1}{2}$ yd. of silk at $4 a yd.

LXXXVII. — MISCELLANEOUS, COUNTING BY 5'S FROM 3 AND 2

1. A dime is worth —— cents.

2. 2 dimes are worth —— cents.

3. A nickel is worth —— cents.

4. 2 nickels are worth —— cents.

5. 1 nickel and 1 dime are together worth —— cents.

6. A quarter is worth —— cents.

7. 2 quarters are worth —— cents.

8. If street-car fare is 5 cents, what is the fare for four persons?

9. In fair exchange for a dime I should receive —— nickels.

10. 2 weeks are —— days.
 3 weeks are —— days.
 4 weeks are —— days.

11. 1 dozen cuffs and 2 cuffs are —— cuffs.
 1 dozen cuffs and 8 cuffs are —— cuffs.
 2 dozen cuffs are —— cuffs.

12. 1 week and 1 day are —— days.
 1 week and 2 days are —— days.
 1 week and 4 days are —— days.

13. Beginning at 3, count by 5's to 33.
14. Beginning at 2, count by 5's to 32.

OPTIONAL

1. 24 ounces = —— pounds.
2. 20 ounces = —— pounds.
3. 16 oranges = —— dozen oranges.
4. 15 oranges = —— dozen oranges.
5. Tell a story of 3 cents a day for a week.

LXXXVIII.—HALVES, COUNTING BY 5'S FROM 1, BY 6'S FROM 6

1. $\frac{1}{2}$ of 20 (2 tens) =
$\frac{1}{2}$ of 4 =
$\frac{1}{2}$ of 24 =

2. $\frac{1}{2}$ of 40 (4 tens) =
$\frac{1}{2}$ of 6 =
$\frac{1}{2}$ of 46 =

3. $\frac{1}{2}$ of 60 (6 tens) =
$\frac{1}{2}$ of 8 =
$\frac{1}{2}$ of 68 =

4. 6 is $\frac{1}{2}$ of ——.
5 is $\frac{1}{2}$ of ——.
4 is $\frac{1}{2}$ of ——.

5. 10 is $\frac{1}{2}$ of ——.
3 is $\frac{1}{2}$ of ——.
30 is $\frac{1}{2}$ of ——.

6. 2 is $\frac{1}{2}$ of ——.
20 is $\frac{1}{2}$ of ——.

7. 4 is $\frac{1}{2}$ of ——.
40 is $\frac{1}{2}$ of ——.

8. 5 is $\frac{1}{2}$ of ——.
50 is $\frac{1}{2}$ of ——.

9. 7 is $\frac{1}{2}$ of ——.
8 is $\frac{1}{2}$ of ——.

10. 9 is $\frac{1}{2}$ of ——.
1 is $\frac{1}{2}$ of ——.

11.	10 is ½ of ——.	12.	1½ is ½ of ——.
	1 is ½ of ——.		2½ is ½ of ——.
	11 is ½ of ——.		12 is ½ of ——.

13. Beginning at 1, count by 5's to 31.

14. Beginning at 6, count by 6's to 36.

OPTIONAL

1. Draw a rectangle 3 by 4 inches.
2. This rectangle contains —— square inches.
3. The line at the bottom is —— inches long.
4. The line at the right is —— inches long.
5. The line at the top is —— inches long.
6. The line at the left is —— inches long.
7. These lines all together are —— inches long.
8. To reach round the rectangle a string would have to be —— inches long.

9. Tell a story about a rectangle and the distance round it.

LXXXIX. — MISCELLANEOUS, COUNTING BY 6'S FROM 5 AND 4

1. Mr. Jones had 8 cows. He bought 3 more. Then he had —— cows.

2. At 5 cents apiece 4 pencils cost —— cents.

3. How many 2-cent stamps can be bought for 10 cents?

4. John paid 10 cents for 2 pencils. For 1 pencil he paid —— cents. ½ of 10 cents is —— cents.

5. A dozen eggs cost 18 cents. 6 eggs cost —— cents. ½ of 18 cents = —— cents.

6. ½ of 5 inches is —— inches. 5 inches are ½ of —— inches.

7. ½ of 7 days is —— days. 7 days are ½ of —— days.

8. ½ of 6 inches is —— inches. 6 inches are ½ of —— inches.

9. ½ of 22 =
½ of 23 =

10. ½ of 24 =
½ of 25 =

11. ½ of 26 =
½ of 27 =

12. ½ of 28 =
½ of 29 =

13. ½ of 42 =
½ of 43 =

14. ½ of 44 =
½ of 45 =

15. ½ of 46 =
½ of 47 =

16. ½ of 48 =
½ of 49 =

17. Beginning at 5, count by 6's to 35.

18. Beginning at 4, count by 6's to 34.

OPTIONAL

1. 2 inches are ½ of —— inches.
2. 3 inches are ½ of —— inches.
3. 1½ inches are ½ of —— inches.

4. 4 pens are ⅓ of —— pens.
5. 2½ inches are ½ of —— inches.
6. Tell a story about buying ½ of 7 yards of cloth.

XC. — SUBTRACTION, COUNTING BY 6'S FROM 3 AND 2

First orally without the book, then copy in full
See note in Lesson LXXVII

Subtract:

1.	3	13	23	33	43	2.	4	14	24	34	44
	1	1	1	1	1		1	1	1	1	1
3.	5	15	25	35	45	4.	6	16	26	36	46
	1	1	1	1	1		2	2	2	2	2
5.	7	17	27	37	47	6.	8	18	28	38	48
	2	2	2	2	2		2	2	2	2	2
7.	9	19	29	39	49	8.	10	20	30	40	50
	2	2	2	2	2		2	2	2	2	2

9. Beginning at 3, count by 6's to 33. (Not to be written.)

10. Beginning at 2, count by 6's to 32. (Not to be written.)

11. If a boy having 13 cents spends 2 cents, he will have —— cents left.

12. A man having 19 cows sold 2 of them. He had —— cows left.

13. 17 houses were on a certain street. 2 of them were torn down. There were —— houses left.

14. Make a problem like one of the last three problems, using the numbers 20 and 2.

OPTIONAL

1. If from a line 2 feet long you cut off 1 inch, the line will be only —— inches long.

2. If from a board 8 feet long you saw off 2 feet, the board will be only —— yards long.

3. If from a string 5 yards long, 1 foot be cut off, the string will be only —— feet long.

4. Tell a story about yards and feet.

5. Tell a story beginning with feet and ending with yards.

XCI.—SUBTRACTION, COUNTING BY 6'S FROM 1, BY 7'S FROM 7

First orally without the book, then copy in full
See Lesson LXXVII

Subtract:

1.	4	14	24	34	44	2.	5	15	25	35	45
	3	3	3	3	3		3	3	3	3	3
3.	6	16	26	36	46	4.	7	17	27	37	47
	3	3	3	3	3		3	3	3	3	3

5.	8	18	28	38	48	6.	9	19	29	39	49
	3	3	3	3	3		3	3	3	3	3

7.	10	20	30	40	50	8.	5	15	25	35	45
	3	3	3	3	3		4	4	4	4	4

9. Beginning at 1, count by 6's to 31. (Not to be written.)

10. Beginning at 7, count by 7's to 35. (Not to be written.)

11. 14 books lay on the table. 3 of them were removed to a shelf. There were —— books left on the table.

12. 20 eggs were in a basket. After 3 of them were used, there were —— left in the basket.

13. 25 pens were in a box. 4 pens were taken out, leaving but ——.

14. Make a problem like one of the last three, using the numbers 17 and 3.

OPTIONAL

1. A girl having 4 peaches gave three of them away. She then had —— left.

2. John had five dollars and gave 3 dollars for a pair of shoes and a hat. He had but —— dollars left.

3. Mary had 7 pencils, but lost 3 of them. She had —— left.

4. 8 sheep were in a pasture. After 3 of them were driven to the barn there were only —— left.

5. Tell a story of 10 dolls in a store, telling how many were left after some girls went shopping.

XCII.—SUBTRACTION, COUNTING BY 7'S FROM 6 AND 5

First orally without the book, then copy in full
See Lesson LXXVII

Subtract:

1.	6	16	26	36	46	2.	7	17	27	37	47
	4	4	4	4	4		4	4	4	4	4
3.	8	18	28	38	48	4.	9	19	29	39	49
	4	4	4	4	4		4	4	4	4	4
5.	10	20	30	40	50	6.	6	16	26	36	46
	4	4	4	4	4		5	5	5	5	5
7.	7	17	27	37	47	8.	8	18	28	38	48
	5	5	5	5	5		5	5	5	5	5
9.	9	19	29	39	49	10.	10	20	30	40	50
	5	5	5	5	5		5	5	5	5	5

11. Beginning at 6, count by 7's to 34. (Not to be written.)

12. Beginning at 5, count by 7's to 33. (Not to be written.)

13. 16 sheets of paper lay upon the floor. 4 of them were soiled. How many were in good condition?

14. From a pound of butter 4 ounces were eaten. How many ounces were left?

15. Make a problem like the 14th, but do not use the number 4.

OPTIONAL

1. From a stick $\frac{1}{2}$ of a foot long 4 inches were broken off. The stick was then —— inches long.

2. From $\frac{3}{4}$ of a foot take 4 inches. You will have —— inches left.

3. $\frac{2}{3}$ of a foot − 5 inches = —— inches.

4. $\frac{3}{4}$ of a foot − 5 inches = —— inches.

5. Tell a story of a shrub 3 yards high and growing 2 feet higher.

XCIII. — SUBTRACTION, COUNTING BY 7'S FROM 4 AND 3

First orally without the book, then copy in full
See Lesson LXXVII

Subtract:

1.	7	17	27	37	47	2.	8	18	28	38	48
	6	6	6	6	6		6	6	6	6	6
3.	9	19	29	39	49	4.	10	20	30	40	50
	6	6	6	6	6		6	6	6	6	6

5.	8	18	28	38	48	**6.**	9	19	29	39	49
	7	7	7	7	7		7	7	7	7	7
7.	10	20	30	40	50	**8.**	9	19	29	39	49
	7	7	7	7	7		8	8	8	8	8
9.	10	20	30	40	50	**10.**	10	20	30	40	50
	8	8	8	8	8		9	9	9	9	9

11. Beginning at 4, count by 7's to 32.

12. Beginning at 3, count by 7's to 31.

13. A boy having 17 marbles lost 6 of them. He had —— marbles left.

14. A girl having 19 buttons gave 6 of them to her mother. Then she had —— buttons left.

15. Make a problem like the 13th or 14th.

OPTIONAL

1. My sister was away from home 2 weeks lacking 3 days. She was away —— days.

2. The month of January has 31 days. January has 4 weeks and —— days.

3. If from 10 dollars I lose 6 dollars, I shall have —— dollars left.

4. From a bunch of 19 roses a lady lost 7 roses. She had —— roses left.

5. A boy having 18 marbles gave 7 of them to a friend. He had —— marbles left.

6. Tell a story beginning with 13 cents and ending with 7 cents.

XCIV.—SUBTRACTION, COUNTING BY 7'S FROM 2 AND 1

First orally without the book, then copy in full
See Lesson LXXVII

Subtract:

1.	11	11	11	11	11	2.	11	11	11	11	11
	1	2	3	4	5		6	7	8	9	10
3.	12	12	12	12	12	4.	12	12	12	12	12
	1	2	3	4	5		6	7	8	9	10
5.	13	13	13	13	13	6.	13	13	13	13	13
	1	2	3	4	5		6	7	8	9	10
7.	14	14	14	14	14	8.	14	14	14	14	14
	1	2	3	4	5		6	7	8	9	10
9.	15	15	15	15	15	10.	15	15	15	15	15
	1	2	3	4	5		6	7	8	9	10

11. Beginning at 2, count by 7's to 30.
12. Beginning at 1, count by 7's to 29.
13, Make concrete examples of the 6th exercise.

OPTIONAL

1. $\frac{1}{2}$ of 11 inches = —— inches.
2. 11 peaches − 5 peaches = —— peaches.
3. 11 peaches − 6 peaches = —— peaches.

4. 5 peaches + 6 peaches = —— peaches.
5. 13 eggs − 8 eggs = —— eggs.
6. 13 eggs − 5 eggs = —— eggs.
7. 8 eggs + 5 eggs = —— eggs.

8. Tell a story beginning with 15 and ending with 7.

XCV. — SUBTRACTION, COUNTING BY 8'S FROM 8 AND 7

First orally without the book, then copy in full
See Lesson LXXVII

Subtract:

1.	16	16	16	16	16	2.	16	16	16	16	16
	1	2	3	4	5		6	7	8	9	10
3.	17	17	17	17	17	4.	17	17	17	17	17
	1	2	3	4	5		6	7	8	9	10
5.	18	18	18	18	18	6.	18	18	18	18	18
	1	2	3	4	5		6	7	8	9	10
7.	19	19	19	19	19	8.	19	19	19	19	19
	1	2	3	4	5		6	7	8	9	10
9.	20	20	20	20	20	10.	20	20	20	20	20
	1	2	3	4	5		6	7	8	9	10

11. Beginning at 8, count by 8's to 40. (Not to be written.)

12. Beginning at 7, count by 8's to 39. (Not to be written.)

13. Make concrete examples of the second exercise.

OPTIONAL

1. $2 + 5 + 9 - 5 =$
2. $3 + 6 + 7 - 8 =$
3. $3 + 7 + 7 - 5 =$
4. $7 + 5 + 5 - 6 =$
5. $1 + 6 + 5 - 3 =$
6. $8 + 4 - 9 - 1 =$
7. $5 + 11 + 2 - 8 =$
8. $10 + 9 - 3 - 2 =$
9. $11 + 8 - 2 - 3 =$

10. Tell a story suggested by the first exercise.

11. Tell a story suggested by the eighth exercise. (The first story might run like this: A baker left us 2 loaves of bread on Monday, 5 loaves on Tuesday, and 9 loaves on Wednesday. We had not ordered so many. To use all the bread we fed 5 loaves to the hens. So we used only 11 loaves for the family.)

XCVI. — SUBTRACTION, COUNTING BY 8'S FROM 6 AND 5

First orally without the book, then copy in full
See Lesson LXXVII

Subtract:

1.	11	12	12	13	13	2.	13	14	14	14	14
	10	10	11	10	11		12	10	11	12	13
3.	15	15	15	15	15	4.	16	16	16	16	16
	10	11	12	13	14		10	11	12	13	14

5.	16	17	17	17	17	**6.**	17	17	17	18	18
	15	10	11	12	13		14	15	16	10	11
7.	18	18	18	18	18	**8.**	18	19	19	19	19
	12	13	14	15	16		17	10	11	12	13
9.	19	19	19	19	19	**10.**	20	20	20	20	20
	14	15	16	17	18		10	11	12	13	14
11.	20	20	20	20	20						
	15	16	17	18	19						

12. Beginning at 6, count by 8's to 38. (Not to be written.)

13. Beginning at 5, count by 8's to 37. (Not to be written.)

14. Make a concrete example of the second exercise.

OPTIONAL

1. A farmer having 17 sheep sold 7 of them. He had —— sheep left.

2. A farmer having 18 cows sold 7 of them. He had —— cows left.

3. A girl having 19 marbles gave her brother 11 of them. She had —— marbles left.

4. A boy having 15 cents gave his sister 11 of them. He had —— cents left.

5. A man in an accident lost 3 toes from his right foot and 4 toes from his left foot. He had only —— toes left.

6. In a certain schoolroom there were 18 desks. Three desks were removed to another room. How many desks remained?

7. Tell a story of 19 desks. (Subtraction.)

XCVII. — SUBTRACTION, COUNTING BY 8'S FROM 4 AND 3

First orally without the book, then copy in full
See Lesson LXXVII

Subtract:

1.	11	21	31	41	51	2.	11	21	31	41	51
	1	1	1	1	1		2	2	2	2	2
3.	11	21	31	41	51	4.	11	21	61	71	81
	3	3	3	3	3		4	4	4	4	4
5.	11	61	71	81	91	6.	11	61	71	81	91
	5	5	5	5	5		6	6	6	6	6
7.	11	61	71	81	91	8.	11	61	71	81	91
	7	7	7	7	7		8	8	8	8	8
9.	11	61	71	81	91	10.	12	22	32	42	52
	9	9	9	9	9		3	3	3	3	3

11. Beginning at 4, count by 8's to 36. (Not to be written.)

12. Beginning at 3, count by 8's to 35. (Not to be written.)

13. Make a problem, using the first example in the third exercise.

14. Make a problem, using the first example in the seventh exercise.

OPTIONAL

1. $5 + 2 + 4 - 3 =$
2. $4 + 2 + 4 - 2 =$
3. $3 + 5 + 4 - 5 =$
4. $2 + 3 + 3 - 7 =$
5. $3 + 5 + 9 - 3 =$
6. $2 + 7 + 2 - 4 =$
7. $5 + 3 + 3 - 6 =$
8. $8 + 2 + 5 - 6 =$
9. $2 + 4 + 5 - 9 =$
10. $2 + 1 + 5 - 6 =$

11. Tell a story suggested by the first exercise.

12. Tell a story suggested by the second exercise. (The first story might be this: 5 rabbits were in one pen, 2 in another, and 4 in a third pen, making 11 rabbits in the three pens. 3 rabbits escaped, then there were 8.)

XCVIII.—SUBTRACTION, COUNTING BY 8'S FROM 2 AND 1

First orally without the book, then copy in full
See Lesson LXXVII

Subtract:

1.	12	22	32	42	52	2.	12	62	72	82	92
	4	4	4	4	4		5	5	5	5	5
3.	12	62	72	82	92	4.	12	62	72	82	92
	6	6	6	6	6		7	7	7	7	7

5.	12	22	32	42	52	**6.**	12	22	32	42	52
	8	8	8	8	8		9	9	9	9	9
7.	13	23	33	43	53	**8.**	13	23	33	43	53
	4	4	4	4	4		5	5	5	5	5
9.	13	23	33	43	53	**10.**	13	23	33	43	53
	6	6	6	6	6		7	7	7	7	7

11. Beginning at 2, count by 8's to 34. (Not to be written.)

12. Beginning at 1, count by 8's to 33. (Not to be written.)

13. Make a problem, using the first example of the second exercise.

14. Make a problem, using the first example in the fourth exercise.

OPTIONAL

1. A teacher had 22 pens. She gave 4 of them to some pupils. Then she had —— pens left.

2. A boy carrying a dozen eggs broke 5 of them. He had —— eggs left.

3. A girl having a dozen roses gave 6 of them away. She had —— roses left.

4. From 12 books 7 were taken. How many were left?

5. 13 boys were playing tag. 4 boys went home. Then there were —— boys.

6. 13 men were working in a field. 5 men went to the barn. There were —— men left in the field.

7. Tell a story beginning with 23 and closing with a smaller number.

8. Tell a story containing 32 and 8.

XCIX. — SUBTRACTION, COUNTING BY 9'S FROM 9 AND 8

First orally without the book, then copy in full
See Lesson LXXVII

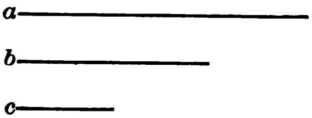
Subtract:

1.	13	23	33	43	53	2.	13	23	33	43	53
	8	8	8	8	8		9	9	9	9	9
3.	14	24	34	44	54	4.	14	24	34	44	54
	5	5	5	5	5		6	6	6	6	6
5.	14	24	34	44	54	6.	14	24	34	44	54
	7	7	7	7	7		8	8	8	8	8
7.	15	25	35	45	55	8.	15	25	35	45	55
	6	6	6	6	6		7	7	7	7	7
9.	15	25	35	45	55	10.	15	25	35	45	55
	8	8	8	8	8		9	9	9	9	9

11. Beginning at 9, count by 9's to 36. (Not to be written.)

12. Beginning at 8, count by 9's to 35. (Not to be written.)

13. By measuring see which two lines together equal the third line.



14. If from *a* a part equal to *b* be taken away, the part remaining is equal to ——.

15. If $b = 9$ and $c = 4$, *a* must equal what?

16. $a - b$ must equal what?

OPTIONAL

1. $2 + 3 + 6 + 2 - 8 =$
2. $2 + 4 + 3 + 4 - 9 =$
3. $2 + 5 + 6 + 1 - 5 =$
4. $2 + 6 + 3 + 3 - 6 =$
5. $2 + 7 + 2 + 3 - 7 =$
6. $2 + 8 + 1 + 3 - 8 =$
7. Tell a story suggested by the first exercise.

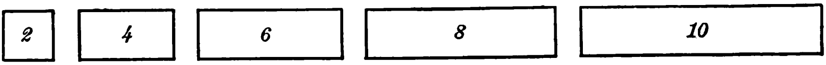
C. — SUBTRACTION, COUNTING BY 9'S FROM 7 AND 6

First orally without the book, then copy in full
See Lesson LXXVII

Subtract:

1.	16	26	36	46	56	2.	16	26	36	46	56
	7	7	7	7	7		8	8	8	8	8
3.	16	26	36	46	56	4.	17	27	37	47	57
	9	9	9	9	9		8	8	8	8	8

5.	17	27	37	47	57	**6.**	18	28	38	48	58
	9	9	9	9	9		9	9	9	9	9



7. How many 2's are there in 4?
8. How many in 8?
9. How many in 10?
10. How many in 6?
11. 2 is equal to —— —— of 4.
12. 2 is equal to —— —— of 6.
13. 2 is equal to —— —— of 8.
14. 2 is equal to —— —— of 10.
15. 4 is equal to —— —— of 10.
16. 6 is equal to —— —— of 10.
17. 8 is equal to —— —— of 10.
18. Beginning at 7, count by 9's to 34.
19. Beginning at 6, count by 9's to 33.

OPTIONAL

1. A father gave his son 3 cents on Monday, 2 cents on Tuesday, and 5 cents on Wednesday. Then the boy spent 7 cents. He had —— cents left.

2. 2 books and 5 books and 3 books less 4 books are —— books.

3. A girl having 25 cents bought a ribbon for 7 cents, a hat-pin for 6 cents, and spent 10 cents for carfare. How many cents did she have left?

4. 1 yd. + 2 yd. – 2 ft. = —— ft.
5. 1 ft. + 3 inches – 7 inches = —— inches.

6. Make a problem similar to the first problem.
7. Make a problem similar to the third problem.

CI. — ADDITION AND SUBTRACTION, COUNTING BY 9'S FROM 5 AND 4

Add:

1.	2.	3.	4.	5.	6.	7.
2	1	3	1	2	4	5
3	3	3	2	2	3	4
5	5	5	3	4	2	3
			4	3	5	1

Subtract:

8.	9.	10.	11.	12.
9	9	25	28	12
7	5	2	7	9
13.	14.	15.	16.	17.
11	21	15	18	17
8	8	8	9	8

18. Beginning at 5, count by 9's to 32. (Mentally only.)

19. Beginning at 4, count by 9's to 31. (Mentally only.)

OPTIONAL

1. 3 yd. – 2 ft. = —— ft.
2. 4 yd. – 2 ft. = —— ft.
3. 2 yd. + 2 ft. = —— ft.

4. 4 yd. + 2 ft. = —— ft.
5. 7 yd. – 1 ft. = —— ft.
6. 3 yd. – 4 ft. = —— ft.

7. Tell a story suggested by the first exercise of this optional work.

8. Tell a story suggested by the fourth exercise.

CII.—ALL OPERATIONS, COUNTING BY 9'S FROM 3 AND 2

Add:

1. $\begin{array}{r}13\\2\\\underline{4}\end{array}$	2. $\begin{array}{r}25\\5\\\underline{6}\end{array}$	3. $\begin{array}{r}12\\3\\\underline{2}\end{array}$	4. $\begin{array}{r}11\\3\\\underline{2}\end{array}$	5. $\begin{array}{r}13\\5\\\underline{2}\end{array}$	6. $\begin{array}{r}11\\3\\3\\\underline{5}\end{array}$

Subtract:

7. $\begin{array}{r}9\\\underline{3}\end{array}$	8. $\begin{array}{r}25\\\underline{4}\end{array}$	9. $\begin{array}{r}43\\\underline{2}\end{array}$	10. $\begin{array}{r}27\\\underline{6}\end{array}$
11. $\begin{array}{r}19\\\underline{7}\end{array}$	12. $\begin{array}{r}39\\\underline{7}\end{array}$	13. $\begin{array}{r}47\\\underline{4}\end{array}$	

Multiply:

14. $\begin{array}{r}4\\\underline{2}\end{array}$	15. $\begin{array}{r}23\\\underline{2}\end{array}$	16. $\begin{array}{r}3\\\underline{3}\end{array}$	17. $\begin{array}{r}32\\\underline{3}\end{array}$	18. $\begin{array}{r}21\\\underline{3}\end{array}$	19. $\begin{array}{r}42\\\underline{2}\end{array}$

Divide:

20. $2\overline{)\underline{22}}$	21. $2\overline{)\underline{44}}$	22. $2\overline{)\underline{66}}$
23. $2\overline{)\underline{88}}$	24. $2\overline{)\underline{12}}$	25. $2\overline{)\underline{13}}$

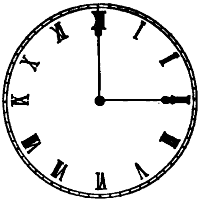
26. Beginning at 3, count by 9's to 30. (Mentally only.)

27. Beginning at 2, count by 9's to 29. (Mentally only.)

OPTIONAL

1. 6 pencils and 4 pencils and 3 pencils less 5 pencils are —— pencils.
2. 3 pencils at 2 cents apiece will cost —— cents.
3. 4 oranges at 3 cents apiece will cost —— cents.
4. At 2 cents apiece, 6 cents will pay for —— pencils.
5. At 3 cents apiece, 12 cents will pay for —— oranges.
6. In 6 there are —— twos.
7. In 12 there are —— threes.
8. At 3 cents apiece, 15 cents will pay for —— lemons.
9. Make a problem like the second problem.
10. Make a problem like the fourth problem.

CIII. — TIME



1. From 12 o'clock until 3 o'clock it is —— hours.
2. From 3 o'clock until 6 o'clock it is —— hours.
3. From 3 o'clock until 5 o'clock it is —— hours.

4. From 6 o'clock until 9 o'clock it is —— hours.

5. An hour is 60 minutes. Half an hour is —— minutes.

6. An hour and a half are —— minutes.

7. A quarter of an hour is —— minutes.

8. An hour and a quarter are —— minutes.

9. From 12 o'clock until 1 o'clock it is —— minutes.

10. From 1 o'clock until quarter past 1 it is —— minutes.

11. From quarter past 1 until quarter before 2 it is —— minutes.

12. From 20 minutes past 1 until 20 minutes before 2 it is —— minutes.

13. Where is the long hand of the clock at 1 o'clock? At 2 o'clock?

14. Where is the long hand of the clock at quarter past 2? At half past 2? At quarter before 3?

OPTIONAL

1. From 3 o'clock until 9 o'clock it is —— hours.
2. From 3 o'clock until 11 o'clock it is —— hours.
3. From 4 o'clock until 11 o'clock it is —— hours.
4. From 2 o'clock until 9 o'clock it is —— hours.

5. From 3 o'clock until 12 o'clock it is —— hours.

6. 12 hours — 7 hours = —— hours.

7. Tell a story of a boy who began to play at 8 o'clock one morning.

8. Tell a story of a girl who gave an afternoon party beginning at 4 o'clock.

CIV. — TIME, MISCELLANEOUS

1. In a certain school the session begins at 9 o'clock and closes at 12. It begins again at 1 o'clock and closes at 3. Each day the school is in session —— hours.

2. From 9 o'clock until half past 10 it is —— minutes.

3. From half past 10 o'clock until 12 o'clock it is —— hours.

4. At 25 minutes past 9 the minute hand is at ——.

5. At 25 minutes past 11 the minute hand is at ——.

6. John should have come at quarter before 10 o'clock. He arrived at 10 minutes past 10. He was —— minutes late.

7. 2 times 3 books = —— books.
3 times 2 pens = —— pens.

2 times 5 pads = —— pads.
2 times 4 chairs = —— chairs.

8. 3 books × 3 = —— books.
4 pens × 3 = —— pens.
5 pads × 2 = —— pads.
7 chairs × 2 = chairs.

NOTE. — In this exercise the sign × is read "*multiplied by.*"

9. ½ of 9 pears = —— pears. 9 pears are ½ of —— pears.

10. ⅓ of 12 months = —— months. 12 months is ⅓ of —— months.

11. 3 months + 9 months + 1 year = —— years.

12. 5 years are ½ of my age. I am —— years old.

OPTIONAL

1. There were 5 books on the table, 4 on a shelf, and 6 on the floor. In all there were —— books.

2. 1 + 2 + 3 + 4 + 5 − 3 =
3. 2 + 3 + 4 + 5 + 3 − 6 =
4. 3 + 4 + 5 + 6 + 1 − 6 =

5. Tell a story of a hen which laid one egg every day for a week.

6. Tell a story of 2 hens, each of which laid one egg every day for a week.

CV. — MISCELLANEOUS

1. There are 24 hours in 1 day. In $\frac{1}{2}$ of a day there are —— hours.

   $\frac{1}{2}$ of 24 is (1 ten and 2).

2. At 3 cents each, how many oranges can you buy for 12 cents?

   3¢ are contained in 12¢ —— times.

3. Jane paid 9 cents for 3 peaches. One peach cost —— cents.

   $\frac{1}{3}$ of 9¢ is —— cents.

4. 2 tens and 2 tens are ——.

   $\frac{1}{2}$ of 40 = ——.

5. 3 tens and 3 tens are ——.

   $\frac{1}{2}$ of 60 = ——.

6. 4 tens and 4 tens are ——.

   $\frac{1}{2}$ of 80 = ——.

7. 5 tens and 5 tens are ——.

   $\frac{1}{2}$ of 100 = ——.

8. Find the difference between 12 cents and $\frac{1}{3}$ of 12 cents.

9. Find the difference between 15 inches and $\frac{1}{3}$ of 15 inches.

10. Find the sum of 12 cents and $\frac{1}{3}$ of 12 cents.

11. Find the sum of 15 cents and $\frac{1}{3}$ of 15 cents.

12. 1 pint of water weighs a pound. 1 quart of water weighs —— pounds.

13. 1 quart + 1 pint = —— pints.

14. 2 quarts + 2 pints = —— quarts.

15. 20 quarts = —— pints.

16. 40 pints = —— quarts.

Divide at sight:

17. $\frac{1}{3}$ of 9 $3\overline{)9}$ $\frac{1}{2}$ of 24 $2\overline{)24}$

$\frac{1}{2}$ of 40 $2\overline{)40}$ $\frac{1}{2}$ of 60 $2\overline{)60}$

$\frac{1}{2}$ of 80 $2\overline{)80}$

OPTIONAL

1. 10 qt. (quarts) = —— pt. (pints).
2. 8 pt. = —— qt.
3. 20 qt. = —— pt.
4. 20 pt. = —— qt.
5. 30 qt. = —— pt.
6. 40 pt. = —— qt.

7. Make a problem containing quarts and pints.

CVI. — MISCELLANEOUS

1. In 2 days there are —— hours.

2 times 24 hours = —— hours.

2. If milk costs 3 cents a pint, 5 quarts will cost —— cents.

5 quarts = —— pints. 10 times 3 cents = —— cents.

3. At 6 cents a quart, how many quarts of milk can you buy for 18 cents?

6¢ are contained in 18¢ —— times.

4. If 3 quarts of berries cost 18 cents, one quart will cost —— cents.

$\frac{1}{3}$ of 18 cents = —— cents.

5. $\frac{1}{4}$ of 12 eggs is —— eggs. $\frac{3}{4}$ of a dozen eggs are —— eggs.

6. 30 = 20 and 10.

One half of 30 = (1 ten and 5) ——.

7. 50 = 40 and 10.

One half of 50 = (2 tens and 5) ——.

8. 70 = 60 and 10.

One half of 70 = (3 tens and 5) ——.

9. 90 = 80 and 10.

One half of 90 = (4 tens and 5) ——.

10. A book cost 30¢ and a knife cost half as much. The knife cost —— cents.

11. A knife cost 50¢ and a pencil cost half as much. The pencil cost —— cents.

12. Find $\frac{1}{3}$ of:

18, 15, 24, 9, 6, 3, 12, 21.

13. Find $\frac{2}{3}$ of:

18, 15, 24, 9, 6, 3, 12, 21.

14. Find the difference between 18 and $\frac{2}{3}$ of 18.

15. Find the difference between 24 and $\frac{2}{3}$ of 24.

Divide at sight:

16. $\frac{1}{2}$ of 30 $2\underline{)30}$ $\frac{1}{2}$ of 50 $2\underline{)50}$

$\frac{1}{2}$ of 70 $2\underline{)70}$ $\frac{1}{2}$ of 90 $2\underline{)90}$

OPTIONAL

1. $8 - \frac{1}{4}$ of $8 =$
2. $9 - \frac{1}{3}$ of $9 =$
3. $8 - \frac{3}{4}$ of $8 =$
4. $9 - \frac{2}{3}$ of $9 =$
5. $12 - \frac{1}{3}$ of $12 =$
6. $12 - \frac{2}{3}$ of $12 =$
7. Make an example like the first, but do not use 8.

CVII. — MISCELLANEOUS

1. If 4 sheep cost 20 dollars, one sheep will cost —— dollars.

$\frac{1}{4}$ of \$20 is —— dollars.

2. At \$4 each how many sheep can be bought for \$20?

\$4 are contained in \$20 —— times.

3. If 3 yards of ribbon cost 15 cents, one yard will cost —— cents.

One third of 15¢ is —— cents.

4. At 5 cents a yard 15 cents will buy —— yards.

5 cents are contained in 15 cents —— times.

5. Jack paid 15¢ for a slate and 20¢ for a book. For both he paid —— cents.

6. Jonas had 35 cents. After paying 10 cents for pens he had —— cents left.

7. Kate walked 3 miles an hour for 5 hours. She walked —— miles in all.

5 times 3 miles are —— miles.

8. A boy rode 30 miles in 3 hours. In one hour he rode —— miles.

One third of 30 miles = —— miles.

9. A girl rode 24 miles, going 8 miles an hour. She rode the distance in —— hours.

8 miles are contained in 24 miles —— times.

10. 30 = 20 and 10.
$\frac{1}{2}$ of 30 =
$\frac{1}{2}$ of 32 =

11. 50 = 40 and 10.
$\frac{1}{2}$ of 50 =
$\frac{1}{2}$ of 52 =

12. 70 = 60 and 10.
$\frac{1}{2}$ of 70 =
$\frac{1}{2}$ of 72 =

13. 90 = 80 and 10.
$\frac{1}{2}$ of 90 =
$\frac{1}{2}$ of 92 =

14. 2 pints = 1 quart. 2 quarts = —— pints.
3 pints = —— quarts. 3 quarts = —— pints.
4 pints = —— quarts. 4 quarts = —— pints.

15. 3 feet = 1 yard. 3 yards = —— feet.
4 feet = —— yards. 4 yards = —— feet.
5 feet = —— yards. 5 yards = —— feet.

OPTIONAL

1. 5 yards of ribbon cost 25 cents. 1 yard costs —— cents.

2. 7 pounds of sugar at 3 cents a pound will cost —— cents.

3. A boat sailing 4 miles an hour for 3 hours will sail —— miles.

4. At 5 cents a pound, 20 cents will buy —— pounds of sugar.

5. At 52 cents a yard, half a yard of cloth will cost —— cents.

6. Make a problem, using $\frac{1}{2}$ and 72. (See 5th problem.)

CVIII. — MISCELLANEOUS

1. $\frac{1}{2}$ of 24 = $\frac{1}{2}$ of 25 = $\frac{1}{2}$ of 26 =
$\frac{1}{2}$ of 27 = $\frac{1}{2}$ of 28 =

2. 32 = 20 and 10 and 2.
$\frac{1}{2}$ of 32 = $\frac{1}{2}$ of 34 =
$\frac{1}{2}$ of 36 = $\frac{1}{2}$ of 38 =

3. 52 = 40 and 10 and 2.

$\frac{1}{2}$ of 52 =
$\frac{1}{2}$ of 54 =
$\frac{1}{2}$ of 56 =
$\frac{1}{2}$ of 58 =

4. 72 = 60 and 10 and 2.

$\frac{1}{2}$ of 72 =
$\frac{1}{2}$ of 74 =
$\frac{1}{2}$ of 76 =
$\frac{1}{2}$ of 78 =

5. 92 = 80 and 10 and 2.

$\frac{1}{2}$ of 92 =
$\frac{1}{2}$ of 94 =
$\frac{1}{2}$ of 96 =
$\frac{1}{2}$ of 98 =

6. A boy had 25 marbles in one pocket and 11 in another. In all he had —— marbles.

7. A girl had 28 beads. After losing 12 of them, she had —— left.

8. Mr. Jones's family uses 4 quarts of milk daily. In a week the family uses —— quarts.

7 times 4 quarts are —— quarts.

9. Mr. Clark uses 10 pounds of ice daily. In how many days will he use 70 pounds?

10 pounds are contained in 70 pounds —— times.

10. 1 foot = 12 inches.

2 feet = —— inches.
$\frac{1}{2}$ of a foot = —— inches.
$\frac{1}{3}$ of a foot = —— inches.
$\frac{2}{3}$ of a foot = —— inches.

11. $\frac{1}{4}$ of a foot = —— inches.
$\frac{2}{4}$ of a foot = —— inches.
$\frac{3}{4}$ of a foot = —— inches.
$\frac{4}{4}$ of a foot = —— inches.

OPTIONAL

1. William spent 14 cents and John spent 7 cents. Together they spent —— cents.

2. Julia had 19 cents; she gave her sister 7 cents; she then had —— cents.

3. John has 18 cents; oranges cost 3 cents each; he can buy —— oranges.

4. Mary paid 11 cents for 2 pounds of sugar. One pound cost —— cents.

5. A farmer bought 8 sheep for $3 each. He paid —— dollars.

6. Make a problem like the 3rd.

CIX. — QUART AND GALLON

Let the pupil see by actual test that one gallon is 4 quarts

1. One quart is —— pints. (Lesson LXXXII.)

2. Two quarts are —— pints. Two pints are —— quart.

3. Three quarts are —— pints. Three pints are —— quarts.

1 gallon
(4 quarts)

1 quart

4. One gallon is four quarts. One quart is —— —— of a gallon.

5. Two gallons are —— quarts. Two quarts are —— —— of a gallon.

6. Three gallons are —— quarts. Three quarts are —— —— of a gallon.

7. Four gallons are —— quarts. Four quarts are —— gallon.

8. Five gallons are —— quarts. Five quarts are —— gallons.

9. Six gallons are —— quarts. Six quarts are —— gallons.

10. 1 quart + 1 pint = —— pints.
11. 1 quart + 1 pint = —— quarts.
12. 2 quarts + 2 pints = —— pints.
13. 2 quarts + 2 pints = —— quarts.
14. 3 quarts + 3 pints = —— pints.
15. 3 quarts + 3 pints = —— quarts.
16. 1 gallon + 1 quart = —— quarts.
17. 1 gallon + 1 quart = —— gallons.
18. 2 gallons + 2 quarts = —— quarts.
19. 2 gallons + 2 quarts = —— gallons.

20. If one quart of milk costs 6¢, one gallon costs —— cents.

If 1 gallon of vinegar costs 28¢, one quart costs —— cents.

22. If 1 quart of syrup costs 24¢, one pint costs —— cents.

OPTIONAL

1. Find the cost of a gallon and 2 quarts of molasses at 60¢ a gallon.
2. 7 gallons = —— quarts.
3. 12 pints = —— quarts.
4. 6 gallons = —— quarts.
5. 6 pints = —— quarts.
6. 1 gallon + 4 quarts + 3 pints = —— quarts.

CX.—PINT, QUART, GALLON, DIVISION

1. 1 quart – 1 pint = —— pint.
2. 3 quarts – 1 quart = —— quarts.
3. 3 quarts + 1 pint + 3 quarts + 1 pint = —— quarts.
4. 4 quarts – 1 pint = —— pints.
5. 5 times 3 gallons = —— gallons.
6. 2 gallons + 1 quart = —— quarts.
7. 2 gallons + 3 quarts = —— gallons.
8. 1 quart is contained in 2 gallons —— times.
9. 1 pint is contained in 2 quarts —— times.

10. At 6¢ a quart, 2 quarts and 1 pint of milk will cost —— cents.

11. At 4¢ a quart, 16¢ will buy —— quarts of milk.

12. 1 gallon is —— quarts. 1 quart is —— pints. 4 quarts are —— pints.

13. 1 gallon is —— pints.

14. At 4¢ a pint, a gallon of milk costs —— cents.

15. $\frac{1}{2}$ of 12 pens is —— pens.

16. 2 pens are contained in 12 pens —— times.

17. $\frac{1}{2}$ of 16 pens is —— pens.

18. 2 pens are contained in 16 pens —— times.

19. $\frac{1}{2}$ of 6 inches is —— inches.

20. 2 inches are contained in 6 inches —— times.

21. $\frac{1}{3}$ of 6 inches is —— inches.

22. 3 quarts are contained in 9 quarts —— times.

23. $\frac{1}{3}$ of 9 quarts is —— quarts.

24. 3 quarts are —— —— of a gallon.

25. $2\underline{)60}$ $2\underline{)24}$ $2\underline{)46}$ $2\underline{)80}$

Note. — Each expression in the 25th exercise stands for 2 problems; the first may be given thus: (1) I had 60 marbles and lost $\frac{1}{2}$ of them, or 30 marbles; (2) I gave 60 marbles to several boys, giving each boy 2 marbles; there were 30 boys. Therefore, the first expression may mean either $\frac{1}{2}$ *of 60,* or *find how many times 2 is contained in 60.* Require pupils to read the problems both ways: as (1) $\frac{1}{2}$ of 60 is 30; (2) 2 is contained in 60 thirty times. Require also both concrete solutions in each example.

OPTIONAL

Copy and fill in the numbers omitted:

	Gallons	Quarts	Pints
1	1	4	8
2	2		
3	3		
4	4		
5		1	
6		2	
7		3	
8		4	
9		5	

	Gallons	Quarts	Pints
10		6	
11		7	
12		8	
13		9	
14		10	
15			1
16			2
17			3
18			4
19			5
20			6
21			7
22			8

CXI.—ADDITION, SUBTRACTION, MULTIPLICATION, DIVISION

1. Mr. Jones had 13 gallons of milk in 1 can and 11 gallons in another. In both he had —— gallons.

13 gal. + 11 gal. =

2. The next day Mr. Jones had 24 gallons of milk, from which he sold 11 gallons. He had —— gallons left.

24 gal. – 11 gal. =

3. A family used a gallon of milk a day for 5 days, making —— quarts in all.

4 quarts × 5 =

4. Mr. Jones divided 20 quarts of milk among several families, giving each a gallon. There were —— families.

20 quarts ÷ 4 quarts =

Note. — This sign (÷) is read "*divided by.*"

5. Mr. Jones gave 15 quarts of milk to five families, giving the same quantity to each. He gave each family —— quarts.

15 qt. ÷ 5 =

Add:

6.	23	24	21	51	31	7.	34	63	13	37	38
	21	20	34	25	27		23	25	24	62	31

8.	26	46	64	54	33
	32	33	34	35	36

Subtract:

9.	33	35	46	58	69	10.	98	97	96	95	94
	21	22	23	24	25		26	33	42	52	21

11. Think of a 2-inch square divided into square inches. If you cannot think how it looks, draw it. How many square inches in it?

12. Think of a 3-inch square divided into square inches. How many square inches in it?

13. Think of a rectangle 1 inch wide and 3 inches long. It contains —— square inches.

14. Think of a rectangle 2 inches wide and 3 inches long. It contains —— square inches.

15. Make a concrete example of the first example in the 9th exercise.

Have the pupils do these exercises mentally like this, (Ex. 6–1) 20, 40, 41, 44; in subtraction, like this, (Ex. 9–1) think 20 from 30, 10, 12. Then show how the same result is obtained with the pencil.

OPTIONAL

Copy and fill in the omissions:

Yards	Feet
1	3
2	
3	
4	
5	
6	
7	

Feet	Inches
1	12
2	
3	
1/6	2
	3
	4
	6
	8
	9

CXII. — AREA AND PERIMETER

1. A 2-inch square contains —— square inches. This is its area.

The area:

2. Of a 3-inch square is —— square inches.
3. Of a 4-inch square is —— square inches.
4. Of a 5-inch square is —— square inches.
5. It would take a string —— inches long to reach round a 2-inch square. This length is the perimeter of the square.

The perimeter:

6. Of a 3-inch square is —— inches.
7. Of a 4-inch square is —— inches.
8. Of a 5-inch square is —— inches.

The area:

9. Of a rectangle 3 inches by 4 inches is —— square inches.
10. Of a rectangle 3 inches by 5 inches is —— square inches.
11. Of a rectangle 4 inches by 5 inches is —— square inches.

The perimeter:

12. Of a rectangle 3 inches by 4 inches is —— inches.
13. Of a rectangle 3 inches by 5 inches is —— inches.
14. Of a rectangle 4 inches by 5 inches is —— inches.

15. A rectangle whose area is 12 square inches may be 3 inches by —— inches.

16. A rectangle whose area is 12 square inches may be 6 inches by —— inches.

17. A rectangle whose area is 15 square inches may be 5 inches by —— inches.

18. A rectangle whose area is 20 square inches may be 4 inches by —— inches.

Read the examples and give differences at sight:

19.	36	27	29	28	30	**20.**	27	35	40	20	26
	4	5	2	6	3		3	4	5	5	5

(Like this: 36 less 4 are 32, or 4 from 36 leave 32.)

21. Make concrete examples of the 20th exercise. As, If a cow costs 27 dollars and another cow $3 less, the second cow costs 24 dollars.

LESSON CXIII.—ADDITION, WITH SUM OF UNITS GREATER THAN 9

1. George and Mary together have 15 apples. George has 8, Mary has ——.

2. Jane and Emma together have 13 cherries. Jane has 9, Emma has ——.

3. The sum of 2 numbers is 15; one of them is 8, the other is ——.

4. The sum of 2 numbers is 13; one of them is 9, the other is ——.

5. Charles earned 17 cents in 2 days. The first day he earned 9 cents, the second he earned —— cents.

6. Mary picked 9 quarts of berries one day. She picked 5 quarts in the morning and —— in the afternoon.

7. The sum of 2 numbers is 17. One of them is 9, the other is ——.

8. The sum of 2 numbers is 9. One of them is 5, the other is ——.

9. The sum of 15 and 3 is ——.

10. The sum of 6 and 7 is ——.

11. The sum of 9 and 4 is ——.

12. The sum of 5 and 6 is ——.

13. The sum of 7 and 4 is ——.

Written. Add:

14. 15
25
10 5 and 5 are 10.
3 2 tens and 1 ten are 3 tens.
40 3 tens and 1 ten are 4 tens or 40.

15. $$\begin{array}{rl}26 & \\ \underline{35} & \\ 11 & \text{5 and 6 are 11, or 1 ten and 1.} \\ \underline{5} & \text{3 tens and 2 tens are 5 tens.} \\ 61 & \text{5 tens and 11 are 61.}\end{array}$$

16. $\begin{array}{r}27\\ \underline{13}\\ 10\\ \underline{3}\\ 40\end{array}$ **17.** $\begin{array}{r}28\\ \underline{14}\\ 12\\ \underline{3}\\ 42\end{array}$

18. $\begin{array}{r}27\\ \underline{36}\end{array}$ **19.** $\begin{array}{r}29\\ \underline{13}\end{array}$ **20.** $\begin{array}{r}16\\ \underline{15}\end{array}$

21. $\begin{array}{r}28\\ \underline{24}\end{array}$ **22.** $\begin{array}{r}15\\ \underline{15}\end{array}$ **23.** $\begin{array}{r}23\\ \underline{38}\end{array}$

OPTIONAL

Add;

1. $\begin{array}{r}17\\ \underline{43}\end{array}$ **2.** $\begin{array}{r}16\\ \underline{55}\end{array}$ **3.** $\begin{array}{r}18\\ \underline{15}\end{array}$ **4.** $\begin{array}{r}27\\ \underline{29}\end{array}$ **5.** $\begin{array}{r}39\\ \underline{39}\end{array}$

6. $\begin{array}{r}14\\ \underline{64}\end{array}$ **7.** $\begin{array}{r}37\\ \underline{37}\end{array}$ **8.** $\begin{array}{r}16\\ \underline{16}\end{array}$ **9.** $\begin{array}{r}35\\ \underline{35}\end{array}$ **10.** $\begin{array}{r}16\\ \underline{26}\end{array}$

CXIV.—ADDITION AND SUBTRACTION

1. I had 16¢ in my hand. My sister had 5 cents. The difference was —— cents.

2. I had a pole 10 feet long. My brother had one 12 feet long. The difference was —— feet.

3. The difference of 13 and 9 is ——.

4. The difference of 15 and 8 is ——.

5. The difference of 17 and 9 is ——.

6. The difference of 11 and 6 is ——.

7. The difference of 15 and 18 is ——.

Written. Add:

8.	28	9.	32	10.	16	11.	49	12.	27	13.	34
	16		29		27		33		13		59

Subtract at sight:

14.	20	30	31	41	15.	30	40	41	31
	4	4	4	4		5	5	5	5

16.	90	70	70	70
	20	30	20	8

OPTIONAL

Find the sum of:

1.	23	2.	23	3.	23	4.	23	5.	23
	21		27		28		39		40
6.	23	7.	23	8.	23	9.	24	10.	24
	48		49		59		68		69
11.	34	12.	35	13.	36	14.	67	15.	63
	29		39		47		26		27
16.	37	17.	29	18.	43	19.	18	20.	47
	49		71		49		82		53

Find the difference of:

21.	30	30	30	30	30
	7	8	6	5	4

LESSON CXV.—PRINCIPLES OF MULTIPLICATION

1. The length of one side of a 2-inch square is —— inches. The length of the four sides together is —— inches. 4 times 2 inches are —— inches.

2. In the garden were 5 rows of corn with 10 hills in a row. In all there were —— hills of corn. 5 tens are ——.

3. 3 twos are ——. 2 threes are ——.

4. 3 fours are ——. 4 threes are ——.

5. The product of 2 and 3 is ——.

6. The product of 3 and 4 is ——.

7. The product of 2 and 4 is ——.

8. The product of 4 and 5 is ——.

9. The product of 2 and 20 is ——.

10. The product of 30 and 2 is ——.

11. 6 is the product of 2 and ——.

12. 12 is the product of 3 and ——.

13. 12 is the product of 2 and ——.

14. 20 is the product of 5 and ——.

15. 20 is the product of 2 and ——.

16. The product of two numbers is 15. One of the numbers is 3, the other is ——.

17. The product of two numbers is 18. One of them is 6, the other is ——.

Read and give products at sight. (As, 2 times 30 are 60.)

$$\begin{array}{lrrrrrlrrrrr} \textbf{18.} & 30 & 20 & 30 & 20 & 40 & \textbf{19.} & 21 & 22 & 23 & 33 & 21 \\ & \underline{2} & \underline{2} & \underline{3} & \underline{3} & \underline{2} & & \underline{2} & \underline{3} & \underline{2} & \underline{3} & \underline{4} \end{array}$$

20. Give concrete solutions of the 18th exercise. As, If one pencil costs 30 cents, 2 pencils cost 60 cents.

LESSON CXVI. — DIVISION

1. Father paid 15 cents for 3 pounds of sugar. One pound cost —— cents. One third of 15¢ is —— cents.

2. James paid 25 cents for oranges. They cost 5 cents each. He bought —— oranges. 5 cents are contained in 25 cents —— times.

3. The quotient of 6 divided by 2 is ——.

4. The quotient of 6 divided by 3 is ——.

5. The quotient of 12 divided by 3 is ——.

6. The quotient of 16 divided by 4 is ——.

7. The quotient of 15 divided by 3 is ——.

8. The quotient of 15 divided by 5 is ——.

9. The quotient of 20 divided by 2 is ——.

10. The quotient of 30 divided by 10 is ——.

11. $\frac{1}{2}$ of 16 is ——. 2 is contained in 16 —— times.

12. $\frac{1}{3}$ of 15 is ——. 3 is contained in 15 —— times.

13. $\frac{1}{4}$ of 16 is ——. 4 is contained in 16 —— times.

14. $\frac{1}{5}$ of 15 is ——. 5 is contained in 15 —— times.

15. $\frac{1}{2}$ of 30 is ——. 2 is contained in 30 —— times.

16. $\frac{1}{2}$ of 60 is ——. 2 is contained in 60 —— times.

Read and give quotients at sight:

17. $2\underline{)84}$ $3\underline{)63}$ $3\underline{)33}$ $3\underline{)30}$ $3\underline{)60}$

18. $4\underline{)12}$ $4\underline{)16}$ $4\underline{)20}$ $4\underline{)24}$ $4\underline{)28}$

NOTE. — (1) One half of 84 is 42. (2) 2 is contained in 84 forty-two times. Make concrete examples; as, (1) 2 men received 84 dollars. How much did each receive? (2) $84 were given to several men, each receiving $2. How many men were there?

OPTIONAL

Find the sum of:

1. $\begin{array}{r}28\\ \underline{47}\end{array}$ **2.** $\begin{array}{r}63\\ \underline{29}\end{array}$ **3.** $\begin{array}{r}28\\ \underline{59}\end{array}$ **4.** $\begin{array}{r}37\\ \underline{55}\end{array}$ **5.** $\begin{array}{r}71\\ \underline{19}\end{array}$

Find the difference of:

6. $\begin{array}{r}17\\ \underline{\ \ 9}\end{array}$ **7.** $\begin{array}{r}35\\ \underline{\ \ 6}\end{array}$ **8.** $\begin{array}{r}85\\ \underline{\ \ 6}\end{array}$ **9.** $\begin{array}{r}71\\ \underline{\ \ 3}\end{array}$ **10.** $\begin{array}{r}81\\ \underline{\ \ 3}\end{array}$

Find the product of:

11. $\begin{array}{r}21\\ \underline{\ \ 2}\end{array}$ **12.** $\begin{array}{r}13\\ \underline{\ \ 2}\end{array}$ **13.** $\begin{array}{r}23\\ \underline{\ \ 2}\end{array}$ **14.** $\begin{array}{r}24\\ \underline{\ \ 2}\end{array}$ **15.** $\begin{array}{r}21\\ \underline{\ \ 3}\end{array}$

Find the quotient of:

16. $8 \div 2$. **17.** $12 \div 3$. **18.** $20 \div 4$.
19. $28 \div 4$. **20.** $24 \div 4$. **21.** $15 \div 3$.

CXVII.—SUM, DIFFERENCE, PRODUCT, QUOTIENT

1. The sum of 12 and 3 is ——.
2. The difference of 12 and 3 is ——.
3. The product of 12 and 3 is ——.
4. The quotient of 12 divided by 3 is ——.
5. The sum of 10 and 2 is ——.
6. The difference of 10 and 2 is ——.
7. The product of 10 and 2 is ——.
8. The quotient of 10 divided by 2 is ——.
9. The sum of 8 and 2 is ——.
10. The difference of 8 and 2 is ——.
11. The product of 8 and 2 is ——.
12. The quotient of 8 divided by 2 is ——.
13. $9 + 3 =$ ——. 14. $9 - 3 =$ ——.

15. $9 \times 3 =$ ——. **16.** $9 \div 3 =$ ——.

17. $4 + 2 =$ ——. **18.** $4 - 2 =$ ——.

19. $4 \times 2 =$ ——. **20.** $4 \div 2 =$ ——.

NOTE. — The sign ÷ is read "*divided by.*"

Find the sum of:

21. $\begin{array}{r}32\\ \underline{29}\end{array}$ **22.** $\begin{array}{r}33\\ \underline{38}\end{array}$ **23.** $\begin{array}{r}34\\ \underline{57}\end{array}$ **24.** $\begin{array}{r}28\\ \underline{19}\end{array}$

Find the difference of:

25. $\begin{array}{r}32\\ \underline{8}\end{array}$ **26.** $\begin{array}{r}19\\ \underline{7}\end{array}$ **27.** $\begin{array}{r}37\\ \underline{8}\end{array}$ **28.** $\begin{array}{r}25\\ \underline{9}\end{array}$

Find the product of:

29. $\begin{array}{r}10\\ \underline{7}\end{array}$ **30.** $\begin{array}{r}22\\ \underline{4}\end{array}$ **31.** $\begin{array}{r}40\\ \underline{2}\end{array}$ **32.** $\begin{array}{r}12\\ \underline{3}\end{array}$

Find the quotient of:

33. $6 \div 2$. **34.** $18 \div 6$.

35. $12 \div 4$. **36.** $14 \div 7$.

CXVIII. — SUM, DIFFERENCE, PRODUCT, QUOTIENT — *Continued*

1. A sum is found by ——.
2. A difference is found by ——.
3. A product is found by ——.
4. A quotient is found by ——.

5. The sum of 1 foot and 6 inches is —— inches.

6. The difference of 1 foot and 6 inches is —— inches.

7. The product of 2 feet and 3 is —— feet. (2 feet × 3 = ——.)

8. The quotient of 2 feet divided by 6 inches is ——. (How many 6 inches in 2 feet?)

9. The sum of 2 yd. and 2 ft. is —— feet.

10. The difference of 2 yd. and 2 ft. is —— feet.

11. The product of 2 yd. and 6 is —— yd. (2 yd. × 6 = ——.)

12. The quotient of 2 yd. divided by 2 ft. is ——. (How many 2 ft. in 2 yd.?)

13. The sum of 3 quarts and 1 pint is —— pints.

14. The difference of 3 quarts and 1 pint is —— pints or —— quarts.

15. The product of 3 quarts and 7 is —— quarts.

16. The quotient of 3 quarts divided by 1 pint is ——.

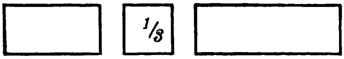
17. By adding two or more numbers we obtain their ——.

18. By subtracting one number from another e obtain their ——.

19. By multiplying one number by another we obtain their ——.

20. By dividing one number by another we obtain their ——.

21. What is the middle unit?



22. What is the name of the one at the left? (Comparing with the middle unit.)

23. Name the unit at the right.

24. What must be added to the unit $\frac{2}{3}$ to equal the unit 1?

25. What must be added to the unit $\frac{1}{3}$ to equal the unit 1?

26. The 1 is how many times the $\frac{1}{3}$?

27. The $\frac{2}{3}$ is how many times the $\frac{1}{3}$?

CXIX.—MISCELLANEOUS

1. The cost of 1 ft. of copper wire equals —— —— of the cost of 1 yd.

2. 1 yd. will cost —— times as much as $\frac{1}{3}$ of a yard.

3. 1 yd. will cost —— times as much as 1 ft.

4. The cost of 2 ft. of wire equals —— —— of the cost of 1 yd.

5. Jack has 6 marbles and James has $\frac{2}{3}$ as many. James has ——.

6. If 3 fountain pens cost $9, what part of $9 will 2 fountain pens cost? 2 fountain pens will cost —— dollars.

7. If 2 fountain pens cost $4, one will cost —— dollars. Three will cost —— dollars.

8. If $\frac{1}{3}$ of a garden is worth $20, the whole garden is worth —— dollars.

9. If we call 4 inches 1, what shall we call $\frac{2}{3}$ of a foot?

10. If we call 4 inches 1, what shall we call a foot?

11. If 4 inches of ribbon cost 2 cents, what will $\frac{2}{3}$ of a foot cost?

12. A gallon of oil costs 16¢. A quart will cost —— cents.

13. 3 quarts are —— —— of a gallon.

14. 3 quarts will cost —— —— of 16¢. 3 quarts will cost —— cents.

15. 1 pint is —— —— of a quart. 1 pint of oil will cost —— cents.

Find the sum of:

16. 12 and $\frac{2}{3}$ of 12.

17. 9 and $\frac{2}{3}$ of 9.

18. 6 and $\frac{2}{3}$ of 6.

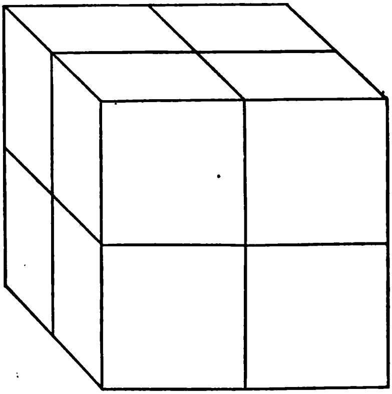
19. 15 and $\frac{2}{3}$ of 15.

Find the difference of:

20. 12 and $\frac{2}{3}$ of 12. 21. 9 and $\frac{2}{3}$ of 9.

22. 6 and $\frac{2}{3}$ of 6. 23. 15 and $\frac{2}{3}$ of 15.

CXX.—THE 2-INCH CUBE, ADDITION AND SUBTRACTION



1. With 1-inch cubes build a 2-inch cube. How many 1-inch cubes does it take?
2. A 2-inch cube contains —— cubic inches.
3. There are —— 1-inch cubes on the bottom.
4. There are —— 1-inch cubes on the top.
5. 2 times 4 cubic inches are —— cubic inches.
6. At the top of a cube there are —— corners.
7. At the bottom of a cube there are —— corners.

8. A cube has —— corners in all.

9. At the top of a cube there are —— edges.

10. At the bottom of a cube there are —— edges.

11. Besides these —— edges there are —— more edges. 3 times 4 edges are —— edges. 4 edges × 3 = —— edges. A cube has —— edges.

12. A cube has —— faces.

13. A 1-inch cube is equal to —— —— of a 2-inch cube.

Add at sight:

14.	4	4	4	6	**15.**	5	6	6	6
	4	3	5	3		6	6	4	7

16.	8	8	8	8	**17.**	9	9	9	11
	8	9	7	6		9	8	10	9

18.	7	7	7	8	**19.**	8	8	9	9
	3	4	5	5		3	4	3	4

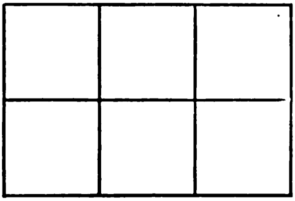
Subtract at sight:

20.	25	26	27	28	**21.**	18	18	18	18
	6	7	8	9		6	7	8	9

22.	38	37	36	35	**23.**	33	34	35	36
	6	7	8	9		6	7	8	9

24. 45	44	43	42	**25.** 35	33	31	41
6	7	8	9	6	7	8	9

CXXI. — SIXTHS AND TWELFTHS



1. How many squares in the figure? Each square is ——— ——— of the figure.

2. How many 2-squares? 2 squares are ——— ——— of the figure.

3. How many 3-squares? 3 squares are ——— ——— of the figure.

4. How many 2-squares in 4 squares? 4 squares are ——— ——— of the figure.

5. One half of the figure equals ——— squares or ——— sixths.

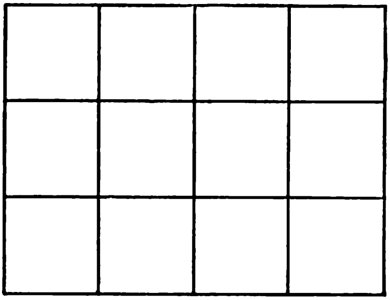
6. One third of the figure equals ——— squares or ——— sixths.

7. Two thirds of the figure equals ——— squares or ——— sixths.

8. 1 half and 1 third equal ——— sixths and ——— sixths or ——— sixths.

9. 5 sixths less 1 half equal 5 sixths less ——— sixths or ——— sixths, which equal ——— third.

10. 5 sixths less 2 thirds equal 5 sixths less —— sixths or —— sixth.



11. How many squares in the figure? Each square is —— —— of the figure.

12. How many 6-squares in the figure? Six squares are —— —— of the figure.

13. How many 4-squares in the figure? Four squares are —— —— of the figure.

14. How many 3-squares in the figure? Three squares are —— —— of the figure.

15. How many 2-squares in the figure? Two squares are —— —— of the figure.

16. There are —— squares or —— twelfths in the figure.

17. One half equals —— squares or —— twelfths.

18. One third equals —— squares or —— twelfths.

19. One fourth equals —— squares or —— twelfths.

20. One sixth equals —— squares or —— twelfths.

Add at sight:

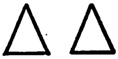
21.					**22.**				
	1	1	2	2		3	4	5	3
	2	2	1	2		3	4	5	3
	2	3	4	1		2	2	3	6
	1	2	3	3		2	2	3	6
	3	4	5						

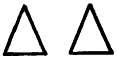
Subtract at sight:

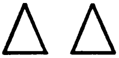
23.					**24.**				
	21	32	43	54		52	72	83	95
	9	8	7	6		9	8	7	6

25.				
	11	12	13	15
	7	5	8	7

CXXII.—THIRDS, MULTIPLICATION AND DIVISION



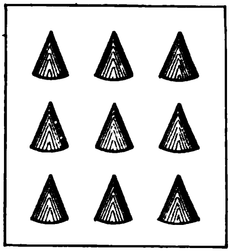




1. One third of 6 triangles is —— triangles.

2. Two thirds of 6 triangles are —— triangles.

3. 6 triangles less $\frac{2}{3}$ of 6 triangles are —— triangles.



4. One third of 9 cones is ——— cones.

5. Two thirds of 9 cones are ——— cones.

6. 9 cones less $\frac{2}{3}$ of 9 cones are ——— cones.

7. One third of 15 apples is ——— apples.

8. Two thirds of 15 apples are ——— apples.

9. 15 apples less $\frac{2}{3}$ of 15 apples are ——— apples.

10. 18 inches less $\frac{2}{3}$ of 18 inches equal ——— inches.

11. 12 inches less $\frac{2}{3}$ of 12 inches equal ——— inches.

12. 30 marbles less $\frac{2}{3}$ of 30 marbles equal ——— marbles.

13. 24 cents less $\frac{2}{3}$ of 24 cents equal ——— cents.

14. 4 triangles are 2 thirds of ——— triangles.

15. 6 cones are 2 thirds of ——— cones.

Multiply at sight:

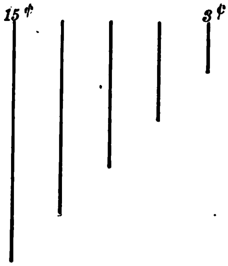
16.	13	12	14	12	17.	21	21	21	20
	2	2	2	3		2	3	4	5
18.	22	22	23	23					
	3	4	2	3					

Divide at sight:

19. 12 ÷ 2. 12 ÷ 3. 12 ÷ 4. 12 ÷ 6.
20. 10 ÷ 2. 10 ÷ 5. 16 ÷ 2. 16 ÷ 4.
21. 16 ÷ 8. 18 ÷ 2. 18 ÷ 3. 18 ÷ 6.
22. 18 ÷ 9. 20 ÷ 2. 20 ÷ 4. 20 ÷ 5.

NOTE. — Require pupils to tell both meanings of each example in exercises 19 to 22. As, 12 divided by 2 means either ½ of 12 or how many 2's in 12.

CXXIII. — PROBLEMS, ADDITION DRILL



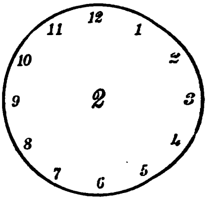
1. If an apple cost 3¢, 2 apples will cost —— cents.
2. 3 apples will cost —— cents.
3. 4 apples will cost —— cents.
4. 5 apples will cost —— cents.
5. 9¢ will buy —— apples.
6. 15¢ will buy —— apples.
7. 6¢ will buy —— apples.
8. When oranges cost 3¢ apiece, 15 cents will buy —— oranges.
9. 9¢ will buy —— oranges.
10. 3¢ equal —— —— of 6 cents.
11. 6¢ equal —— —— of 9 cents.
12. 3 cents equal —— —— of 15 cents.
13. 3 lemons equal —— —— of 12 lemons.

14. 6 lemons equal —— —— of 9 lemons.

15. 6 lemons equal —— —— of 15 lemons.

16. Mary had 12 cents and her brother gave her $\frac{1}{4}$ as much. She then had —— cents.

17. If $\frac{1}{5}$ of my money is 10¢, how many 10¢ are $\frac{2}{5}$ of my money?



18. Addition drill. Add rapidly the central number to every other number in the circle. Change the central number. Require only the sums. The teacher should place the circle upon the blackboard. Do not follow the same order, but point rapidly from one number to another not next to it.

OPTIONAL

1. Make a problem similar to the 8th.
2. Make a problem similar to the 16th.
3. Draw a line 8 inches long, $\frac{1}{2}$ of it is —— inches long. Make a line equal to $\frac{3}{2}$ of it.

CXXIV.—SUBTRACTION, TENS AND ONES

1. 23 = 2 tens and 3 (ones). 20 + 3.
1 ten and 13 (ones). 10 + 13.

2. 45 = 4 tens and 5. 40 + 5.
3 tens and 15. 30 + 15.

3. 27 = —— tens and ——. —— + ——.
—— ten and ——. —— + ——.
4. 56 = —— tens and ——. —— + ——.
—— tens and ——. —— + ——.
5. 73 = —— tens and ——. —— + ——.
—— tens and ——. —— + ——.

Subtract:

6. $$\begin{array}{rcrcr} 54 & = & 40 & + & 14 \\ \underline{28} & \underline{=} & \underline{20} & \underline{+} & \underline{8} \\ & & 20 & + & 6 = 26 \end{array}$$

8 ones cannot be taken from 4 ones. 54 is changed to 4 tens and 14. 8 ones from 14 ones leave 6. 2 tens from 4 tens leave 2 tens.

7. $$\begin{array}{rcrcr} 63 & = & 50 & + & 13 \\ \underline{35} & \underline{=} & \underline{30} & \underline{+} & \underline{5} \\ & & 20 & + & 8 = 28 \end{array}$$

8. $$\begin{array}{rrrrr} 33 & 42 & 47 & 52 & 47 \\ \underline{27} & \underline{19} & \underline{28} & \underline{23} & \underline{19} \end{array}$$

9. $$\begin{array}{rrrrr} 81 & 75 & 64 & 97 & 83 \\ \underline{24} & \underline{48} & \underline{49} & \underline{29} & \underline{48} \end{array}$$

10. $$\begin{array}{rrrrr} 81 & 82 & 83 & 84 & 85 \\ \underline{13} & \underline{24} & \underline{47} & \underline{68} & \underline{39} \end{array}$$

11. $$\begin{array}{rrrrr} 91 & 92 & 93 & 94 & 96 \\ \underline{29} & \underline{33} & \underline{29} & \underline{27} & \underline{49} \end{array}$$

12.	87	84	61	63	93	**13.**	12	13	23	35	36
	18	27	49	37	46		6	8	12	32	21

OPTIONAL

Subtract:

1.	43	27	45	43	2.	81	71	61	51
	19	18	17	18		27	13	15	14
3.	52	62	72	82	4.	33	43	53	63
	19	18	16	15		15	16	17	18
5.	73	61	43	83	6.	44	54	64	74
	19	18	17	16		15	16	17	28
7.	25	35	45	55	8.	26	36	46	56
	17	18	19	16		17	18	19	20
9.	27	37	41	93					
	18	19	22	24					

CXXV. — MULTIPLICATION, UNITS GREATER THAN 9, $\frac{2}{3}$

1. How many are 2 36's?

36		36	
36	or	2	
12		12	2 6's are 12, or 1 ten and 2.
6		6	2 times 3 tens are 6 tens.
72		72	6 tens and 12 are 72.

2. Find 3 times 28.

28			
28		28	
28	or	3	
24		24	3 8's are 24, or 2 tens and 4.
6		6	3 times 2 tens are 6 tens.
84		84	6 tens and 24 are 84.

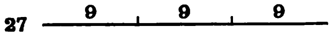
Multiply:

3.	13	14	15	16	17	**4.**	18	19	20	23	24
	4	4	4	4	4		4	4	4	4	4
5.	14	15	16	17	18	**6.**	19	34	35	13	14
	3	3	3	3	3		3	3	3	5	5

Subtract:

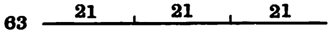
7.	98	87	76	65	54	**8.**	73	84	62	59	44
	39	39	39	46	39		69	28	44	36	27

9. Find $\frac{2}{3}$ of 27.



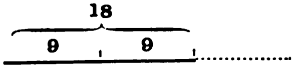
$\frac{1}{3}$ of 27 is ——. $\frac{2}{3}$ of 27 are —— nines, or ——.

10. Find $\frac{2}{3}$ of 63.



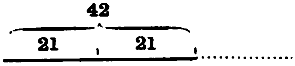
$\frac{1}{3}$ of 63 is ——. $\frac{2}{3}$ of 63 are —— twenty-ones, or ——.

11. 18 is $\frac{2}{3}$ of what number?



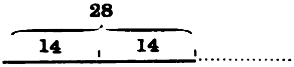
18 is 2 ——'s. The number is 3 ——'s, or ——.

12. 42 is $\frac{2}{3}$ of what number?



42 is 2 ——'s. The number is 3 ——'s, or ——.

13. 28 is $\frac{2}{3}$ of what number?



28 is 2 ——'s. The number is 3 ——'s, or ——.

OPTIONAL

1. Find $\frac{2}{3}$ of 24.
2. Find $\frac{2}{3}$ of 30.
3. Find $\frac{2}{3}$ of 39.
4. Find $\frac{2}{3}$ of 36.
5. 24 is $\frac{2}{3}$ of what number?
6. 30 is $\frac{2}{3}$ of what number?
7. 20 is $\frac{2}{3}$ of what number?
8. 36 is $\frac{2}{3}$ of what number?

CXXVI. — ADDITION, SUBTRACTION, MULTIPLICATION, DIVISION

1. Find the cost of 3 calves at $10 each.
2. 6 calves at $10 each will cost —— dollars.
3. 4 cows at $22 apiece will cost —— dollars.

4. 4 cows at $23 apiece will cost —— dollars.

5. 3 calves cost 30 dollars. Each calf costs —— dollars.

6. 6 calves cost 60 dollars. Each calf costs —— dollars.

7. 4 cows cost $88. Each cow costs —— dollars.

8. 4 sheep cost $48. Each sheep costs —— dollars.

9. 5 cows at $15 each will cost —— dollars.

10. 36 is $\frac{2}{3}$ of what number?

11. Mr. Jones has 15 horses and Mr. Johnson $\frac{2}{3}$ as many. Mr. Johnson has —— horses. They both have —— horses.

12. One boy has 33 marbles. Another has $\frac{2}{3}$ as many. The second boy has —— marbles. He has —— less than the first boy.

Find the sum of:

13.	43	44	45	46	47	**14.**	47	19	27	29	37
	18	17	28	46	47		23	81	45	29	37

Find the difference of:

15.	34	36	45	83	83	**16.**	36	46	56	66	76
	29	19	39	27	17		17	27	47	48	27

Find the product of:

17.	28	36	25	35	45	**18.**	26	26	19	29	39
	3	2	2	2	2		3	2	2	2	2

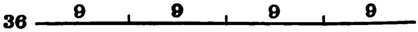
19. Make concrete examples of the 18th exercise. As, 3 cows at $26 apiece will cost $78.

OPTIONAL

1. $\frac{1}{2}$ of 17 = ——. 17 is $\frac{1}{2}$ of ——.
2. $\frac{1}{3}$ of 18 = ——. 18 is $\frac{1}{3}$ of ——.
3. $\frac{2}{3}$ of 18 = ——. 18 is $\frac{2}{3}$ of ——.
4. $\frac{1}{3}$ of 27 = ——. 27 is $\frac{1}{3}$ of ——.
5. $\frac{2}{3}$ of 27 = ——. 27 is $\frac{2}{3}$ of ——.
6. $\frac{1}{3}$ of 12 = ——. 12 is $\frac{1}{3}$ of ——.
7. $\frac{2}{3}$ of 12 = ——. 12 is $\frac{2}{3}$ of ——.

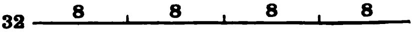
CXXVII.—SUM, DIFFERENCE, PRODUCT, QUOTIENT, $\frac{3}{4}$

1. Find $\frac{3}{4}$ of 36.



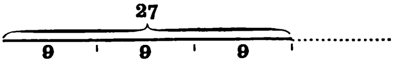
$\frac{1}{4}$ of 36 is ——. $\frac{3}{4}$ of 36 are 3 ——'s, or ——.

2. Find $\frac{3}{4}$ of 32.



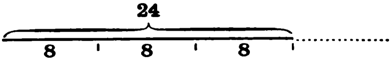
$\frac{1}{4}$ of 32 is ——. $\frac{3}{4}$ of 32 are 3 ——'s, or ——.

3. 27 is $\frac{3}{4}$ of what number?



27 is 3 ——'s. The number is 4 ——'s, or ——.

4. 24 is $\frac{3}{4}$ of what number?



24 is 3 ——'s. The number is 4 ——'s, or ——.

5. Mary is 9 years old, just $\frac{3}{4}$ of Dora's age. Dora is —— years of age.

Mary's age is 3 —— years. Dora's age is 4 —— years, or ——.

6. Eugene has 15 beans in his hand, just $\frac{3}{4}$ as many as Erwin has. Erwin has —— beans.

15 is 3 ——'s. The number of beans which Erwin has is 4 ——'s, or ——.

7. The difference of 12 and $\frac{3}{4}$ of 12 is ——.

8. The difference of 16 and $\frac{3}{4}$ of 16 is ——.

9. The difference of 20 and $\frac{3}{4}$ of 20 is ——.

10. The difference of 24 and $\frac{3}{4}$ of 24 is ——.

Find the sum of:

11.	12.	13.	14.	15.
2	5	6	7	2
3	5	6	7	3
3	3	3	2	8
4	3	3	2	8

NOTE. — Add quickly at sight. In adding give only results. As, in the 11th exercise, 7, 10, 12.

Find the difference of:

16. $\begin{array}{rrr} 15 & 16 & 14 \\ \underline{9} & \underline{7} & \underline{6} \end{array}$ **17.** $\begin{array}{rrr} 18 & 15 & 23 \\ \underline{11} & \underline{4} & \underline{9} \end{array}$

Find the product of.

18. $\begin{array}{rrr} 23 & 15 & 11 \\ \underline{3} & \underline{2} & \underline{4} \end{array}$ **19.** $\begin{array}{rrr} 14 & 15 & 22 \\ \underline{3} & \underline{3} & \underline{4} \end{array}$

Find the quotient of:

20. $3\overline{)99}$ $2\overline{)86}$ $3\overline{)66}$ **21.** $4\overline{)44}$ $4\overline{)88}$ $2\overline{)84}$

NOTE. — Require pupils to read exercises 20 and 21 in both ways. As, (1) $\frac{1}{3}$ of 99; (2) How many 3's in 99?

OPTIONAL

1. Find $\frac{3}{4}$ of 48.
2. Find $\frac{3}{4}$ of 60.
3. Find $\frac{3}{4}$ of 72.
4. 48 is $\frac{3}{4}$ of what number?
5. 60 is $\frac{3}{4}$ of what number?
6. 72 is $\frac{3}{4}$ of what number?

CXXVIII. — TENS AND UNITS IN DIVISION, REVIEW

1. 56 = 5 tens and 6.
   = 4 tens and 16.
2. 38 = —— tens and ——.
   = —— tens and ——.
3. 72 = —— tens and ——.
   = —— tens and ——.

4. Find $\frac{1}{2}$ of 58. $2\overline{)58 = 40 + 18}$

$$20 + 9 = 29$$

Change 58 to 4 tens and 18. $\frac{1}{2}$ of 4 tens is 2 tens. $\frac{1}{2}$ of 18 is 9.

5. Find $\frac{1}{3}$ of 42. $3\overline{)42 = 30 + 12}$

$$10 + 4 = 14$$

Change 42 to 3 tens and 12. $\frac{1}{3}$ of 3 tens is 1 ten. $\frac{1}{3}$ of 12 is 4.

Find:

6. $\frac{1}{2}$ of 56.
7. $\frac{1}{2}$ of 72.
8. $\frac{1}{3}$ of 45.
9. $\frac{1}{3}$ of 48.
10. $\frac{1}{4}$ of 56.
11. $\frac{1}{4}$ of 52.
12. $\frac{1}{5}$ of 60.
13. $\frac{1}{5}$ of 65.
14. 2 pints are —— quart.
15. 6 pints are —— quarts.
16. 28 pints are —— quarts.
17. 56 pints are —— quarts.
18. 98 pints are —— quarts.
19. 4 quarts are —— gallon.
20. 8 quarts are —— gallons.
21. 56 quarts are —— gallons.
22. 52 quarts are —— gallons.
23. 3 feet are —— yard.
24. 6 feet are —— yards.

25. 9 feet are —— yards.
26. 45 feet are —— yards.
27. 21 feet are —— yards.
28. 36 feet are —— yards.

OPTIONAL

1. 8 pints = —— quarts.
2. 9 pints = —— quarts.
3. 11 pints = —— quarts.
4. 21 pints = —— quarts.
5. 12 quarts = —— gallons.
6. 16 quarts = —— gallons.
7. 17 quarts = —— gallons.
8. 18 quarts = —— gallons.
9. 19 quarts = —— gallons.
10. 12 feet = —— yards.
11. 21 feet = —— yards.
12. 22 feet = —— yards.
13. 23 feet = —— yards.
14. $\frac{1}{3}$ of 72 = ——.
15. $\frac{2}{3}$ of 72 = ——.
16. $\frac{1}{4}$ of 52 = ——.
17. $\frac{3}{4}$ of 52 = ——.
18. $\frac{1}{5}$ of 65 = ——.
19. Make a concrete example of the 14th example.

CXXIX.—DIVISION, TENS AND UNITS

Continued.

1. 86 = 8 tens and 6. 80 + 6.
= 7 tens and 16. 70 + 16.
= 6 tens and 26. 60 + 26.
= 5 tens and 36. 50 + 36.
= 4 tens and 46. 40 + 46.
= 3 tens and 56. 30 + 56.
= 2 tens and 66. 20 + 66.
= 1 ten and 76. 10 + 76.

2. 76 = —— tens and ——. —— + ——.
= —— tens and ——. —— + ——.
= —— tens and ——. —— + ——.
= —— tens and ——. —— + ——.
= —— tens and ——. —— + ——.
= —— tens and ——. —— + ——.
= —— ten and ——. —— + ——.

In like manner read 83, 74, 92, 67, 45, and 58.

3. A train ran 84 miles in 3 hours. How far did it run in 1 hour?

In 1 hour it ran —— —— of 84 miles.

$$3\underline{)84 = 60 + 24}$$
$$20 + 8 \quad = 28$$

Change 84 to 6 tens and 24.

$\frac{1}{3}$ of 6 tens is 2 tens. $\frac{1}{3}$ of 24 is 8. 28 miles an hour.

4. A man walked 87 miles in 3 days. How far did he walk in 1 day?

In 1 day he walked —— —— of 87 miles.

$$3\underline{)87 = 60 + 27}$$
$$20 + 9 \quad = 29$$

Change 87 to 6 tens and 27.

$\frac{1}{3}$ of 6 tens is 2 tens. $\frac{1}{3}$ of 27 is 9. 29 miles in 1 day.

5. 4 pails of equal size held 64 pounds of water. How many pounds in each pail?

In each pail there is ______ ______ of 64 pounds.

$$4\overline{)64} = \underline{40 + 24}$$
$$10 + 6 \quad = 16$$

Change 64 to 4 tens and 24.

$\frac{1}{4}$ of 4 tens is ten. $\frac{1}{4}$ of 24 is 6. 16 pounds in each pail.

Find:

6. $\frac{1}{2}$ of 36. $2\overline{)36}$

7. $\frac{1}{2}$ of 54. $2\overline{)54}$

8. $\frac{1}{3}$ of 54. $3\overline{)54}$

9. $\frac{1}{4}$ of 68. $4\overline{)68}$

10. $\frac{1}{4}$ of 72. $4\overline{)72}$

11. $\frac{1}{5}$ of 65. $5\overline{)65}$

12. $\frac{1}{5}$ of 70. $5\overline{)70}$

13. $\frac{1}{5}$ of 75. $5\overline{)75}$

CXXX. — MISCELLANEOUS

1. A man walked 23 miles on Monday, 35 miles on Tuesday, and 24 miles on Wednesday. How far did he walk altogether?

2. 25 feet and 36 feet and 38 feet are how many feet?

3. A boy had 35 cents in one pocket and 48 cents in another. How many had he in both?

4. A girl having 86 cents paid 48 cents for some toys. How many cents had she left?

5. 63 books were on a shelf and 27 books were on a table. How many more books were there on the shelf than on the table?

6. From a pole 65 feet high 26 feet were broken off. How long was the pole then?

7. At $28 each what will 3 stoves cost?

8. If one scuttle of coal weighs 28 pounds, how much will 2 scuttles weigh?

9. One chicken costs 28¢. 4 chickens cost how many cents?

10. 4 pounds of butter were bought for 96¢. What did each pound cost?

11. 5 gallons of oil cost 75¢. What did one gallon cost?

12. If 3 pounds of honey cost 54¢, what will one pound cost?

Add:

13.	24	15	42	**14.**	19	42	15
	32	51	23		2	12	25
	37	23	25		3	18	35

Subtract:

15.	82	41	53	**16.**	72	63	83
	23	28	28		49	39	39

17. $\begin{array}{r}72\\23\\\hline\end{array}\quad\begin{array}{r}63\\24\\\hline\end{array}\quad\begin{array}{r}83\\44\\\hline\end{array}$ **18.** $\begin{array}{r}65\\29\\\hline\end{array}\quad\begin{array}{r}35\\49\\\hline\end{array}\quad\begin{array}{r}29\\53\\\hline\end{array}$

Multiply:

19. $\begin{array}{r}14\\5\\\hline\end{array}\quad\begin{array}{r}24\\3\\\hline\end{array}\quad\begin{array}{r}49\\2\\\hline\end{array}$ **20.** $\begin{array}{r}19\\4\\\hline\end{array}\quad\begin{array}{r}18\\3\\\hline\end{array}\quad\begin{array}{r}29\\2\\\hline\end{array}$

21. $\begin{array}{r}16\\2\\\hline\end{array}\quad\begin{array}{r}19\\3\\\hline\end{array}\quad\begin{array}{r}29\\3\\\hline\end{array}$ **22.** $\begin{array}{r}27\\3\\\hline\end{array}\quad\begin{array}{r}35\\3\\\hline\end{array}\quad\begin{array}{r}25\\3\\\hline\end{array}$

Divide:

23. $5\underline{)70}\quad 3\underline{)72}\quad 2\underline{)98}$ **24.** $4\underline{)76}\quad 3\underline{)58}\quad 2\underline{)58}$

25. $2\underline{)32}\quad 3\underline{)57}\quad 3\underline{)87}$ **26.** $4\underline{)15}\quad 4\underline{)16}\quad 4\underline{)17}$

NOTE. — Require pupils to read examples in exercises 23 to 26 both ways. As, (1) How many 5's in 70; (2) What is $\frac{1}{5}$ of 70? Do not omit the reading.

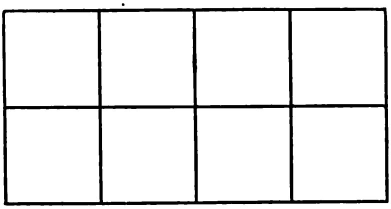
27. Find the cost of 4 cows at $23 each.

28. At $4 each how many sheep can be bought for $92?

OPTIONAL

1. $\frac{1}{2}$ of 29 = ——.
2. $\frac{1}{3}$ of 49 = ——.
3. $\frac{1}{4}$ of 62 = ——.
4. $\frac{1}{5}$ of 71 = ——.
5. $\frac{1}{5}$ of 72 = ——.
6. $\frac{1}{6}$ of 96 = ——.
7. $\frac{1}{7}$ of 91 = ——.
8. $\frac{1}{8}$ of 80 = ——.
9. $\frac{1}{9}$ of 36 = ——.
10. $\frac{1}{10}$ of 30 = ——.
11. Make concrete examples of the 21st exercise.

CXXXI. — HALVES, FOURTHS, SIXTHS, EIGHTHS



1. This rectangle is divided into —— equal squares.

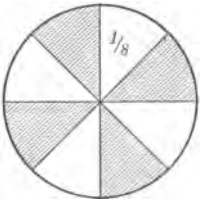
2. If we call the rectangle 1, we may call each square —— ——.

3. How many 2-squares in the rectangle? We may call 2-squares —— ——.

4. How many 4-squares in the rectangle? We may call 4-squares —— ——.

5. —— 2-squares are 6-squares. 2 squares are 1 fourth; 3 2-squares are —— fourths. 6 squares are —— fourths.

6. $\frac{1}{2} = \frac{\quad}{8}$. **7.** $\frac{1}{4} = \frac{\quad}{8}$. **8.** $\frac{2}{4} = \frac{\quad}{8}$. **9.** $\frac{3}{4} = \frac{\quad}{8}$.



10. How many eighths in one half?

11. How many eighths in one fourth?

12. How many eighths in two fourths?

13. How many eighths in three fourths?

14. If an eighth of the rectangle contains 2 square feet, how many square feet in a fourth of it?

15. How many square feet in a half of it?

16. How many square feet in the whole rectangle?

Add:

17. $\frac{1}{2}$ and $\frac{1}{3}$. (Lesson CXXI.) **18.** $\frac{1}{2}$ and $\frac{1}{8}$.

19. $\frac{1}{4}$ and $\frac{1}{8}$. **20.** $\begin{array}{r}25\\ \underline{66}\end{array}$ **21.** $\begin{array}{r}37\\ \underline{54}\end{array}$

Subtract:

22. $\frac{1}{2}-\frac{1}{3}$. **23.** $\frac{1}{2}-\frac{1}{8}$. **24.** $\frac{1}{4}-\frac{1}{8}$.

25. $\begin{array}{r}81\\ \underline{42}\end{array}$ **26.** $\begin{array}{r}91\\ \underline{53}\end{array}$

Multiply:

27. 2 times $\frac{1}{2}$. **28.** 2 times $\frac{1}{4}$.

29. $\begin{array}{r}19\\ \underline{5}\end{array}$ **30.** $\begin{array}{r}26\\ \underline{3}\end{array}$ **31.** $\begin{array}{r}47\\ \underline{2}\end{array}$

Divide:

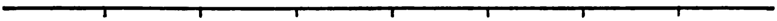
32. $\frac{1}{2}$ by 2. ($\frac{1}{2}$ of a half.)

33. $\frac{1}{4}$ by 2. ($\frac{1}{2}$ of a fourth.)

34. $4\overline{)68}$ **35.** $3\overline{)78}$ **36.** $5\overline{)85}$

NOTE. — Study the rectangle and the circle in exercises 18, 19, 23, 24, 27, 28, 32, and 33.

CXXXII.—HALVES, FOURTHS, EIGHTHS, DRILL



Draw this line and mark it into halves, fourths, and eighths

1. How long is one half of this line if the whole length is 64 inches?

2. How long is one fourth of the line? $\frac{1}{8}$ of the line?

3. What is the length of $\frac{3}{4}$ of the line? $\frac{6}{8}$ of the line? $\frac{2}{4}$ of the line?

4. Now call half of the line 48 inches. How long is $\frac{1}{4}$ of the line?

5. How long is $\frac{1}{8}$ of the line? $\frac{3}{4}$ of the line? $\frac{2}{8}$ of the line?

6. How long is $\frac{5}{8}$ of the line? $\frac{7}{8}$ of the line?

7. If $\frac{1}{2}$ of the line is worth 16 cents, the whole line is worth —— cents.

8. $\frac{1}{4}$ of the line is worth —— cents.

9. $\frac{1}{8}$ of the line is worth —— cents.

10. $\frac{3}{8}$ of the line is worth —— cents.

11. $\frac{3}{4}$ of the line is worth —— cents.

12. $\frac{7}{8}$ of the line is worth —— cents.

13. If 3 eighths of the line is worth 15¢, 1 eighth is worth —— cents, and the whole line is worth —— times —— cents, or —— cents.

14. If $\frac{3}{4}$ of the line is 60 inches long, 1 fourth is —— inches, and the whole line is —— times —— inches, or —— inches.

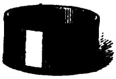
15. Add rapidly the central number to each outer number.

16. Find the difference of the central number and each of the outer numbers. This is to be done rapidly, as in addition, the result only to be named as each number is indicated.

2	*13*	*3*	*14*
9	*3*		*4*
8			*15*
17	*7*	*16*	*5*

NOTE. — Teacher or a pupil point rapidly to each outer number and require pupils to give result instantly. Draw on blackboard. Change the central number, using 1, 2, 4, 5, 6, 7, 8, 9.

CXXXIII. — PECK, BUSHEL



1. 1 peck equals 8 quarts. 1 quart equals —— —— of a peck.

2. 2 quarts equal —— —— of a peck.

3. 2 quarts also equal —— —— of a peck.

4. 3 quarts equal —— —— of a peck.

5. 4 quarts equal —— —— of a peck.

6. 4 quarts also equal —— —— of a peck.

7. 5 quarts equal —— —— of a peck.

8. 6 quarts equal —— —— of a peck.

9. 6 quarts also equal —— —— of a peck.

10. 7 quarts equal —— —— of a peck.

11. 2 pecks equal —— quarts.

12. 3 pecks equal —— quarts.

13. 4 pecks equal —— quarts.

14. Find the cost of a peck of beans at 4¢ a quart.

15. If a peck of potatoes cost 24¢, 1 quart will cost —— —— of 24¢, or —— cents.

16. If a peck of apples cost 32¢, 4 quarts will cost —— —— of 32¢, or —— cents.

17. If a peck of potatoes cost 16¢, 1 quart will cost —— cents, and 3 quarts will cost —— times as much, or —— cents.

18. If a peck of potatoes cost 24¢, 6 quarts will cost —— —— of 24¢, or —— cents.

6 quarts = —— —— of a peck.

19. If a peck of turnips cost 16¢, 1 quart will cost —— —— of 16¢, or —— cents, and 7 quarts will cost —— times —— cents, or —— cents.

20. One bushel is 4 pecks. 1 peck is —— —— of a bushel.

21. Two bushels are —— pecks. 2 pecks are —— —— of a bushel.

22. Three bushels are —— pecks. 3 pecks are —— —— of a bushel.

23. When apples cost 10¢ a peck, a bushel of apples will cost —— cents.

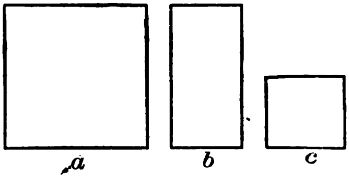
24. When apples cost 60¢ a bushel, a peck will cost —— cents.

25. When apples cost 44¢ a bushel, a peck will cost —— —— of 44¢, or —— cents, and 3 pecks will cost —— times —— cents, or —— cents.

CXXXIV.—MAGNITUDES, SUM, DIFFERENCE, PRODUCT, QUOTIENT

1. *b* is equal to how many times *c*?

2. *a* is equal to how many times *c*?



3. *a* is equal to how many times *b*?

4. If *b* is worth 10¢, what is *a* worth? What is *c* worth?

5. If *a* is worth 16¢, what is *b* worth? What is *c* worth?

6. If *c* is 3, what is *b*? What is *a*?

7. *c* is equal to —— —— of *b*.

8. *c* is equal to —— —— of *a*.

9. *b* is equal to —— —— of *a*.

10. *b* and *c* together are equal to —— —— of *a*.

11. If the length of the square *c* is 1, what is the length of the square *a*? What is the width of *b*? What is the length of *b*?

12. The square of 1 is equal to —— —— of the square of 2.

13. Draw a line, calling it 1. Draw line 2. Draw the square of 1. Draw the square of 2.

14. The square of 2 equals —— times the square of 1.

15. The square of a 3-inch line equals —— —— of the square of a 6-inch line. Draw both squares and compare.

Find the sum of:

16. $\begin{array}{rrrr} 38 & 57 & 62 & 38 \\ \underline{48} & \underline{29} & \underline{29} & \underline{49} \end{array}$ 17. $\begin{array}{rrrr} 17 & 24 & 69 & 41 \\ \underline{28} & \underline{32} & \underline{21} & \underline{39} \end{array}$

18. $\begin{array}{rrrr} 38 & 72 & 16 & 14 \\ \underline{52} & \underline{19} & \underline{15} & \underline{28} \end{array}$

Find the difference of:

19. $\begin{array}{rrrr} 31 & 41 & 51 & 61 \\ \underline{19} & \underline{18} & \underline{17} & \underline{28} \end{array}$ 20. $\begin{array}{rrrr} 34 & 87 & 23 & 84 \\ \underline{18} & \underline{16} & \underline{18} & \underline{27} \end{array}$

21. $\begin{array}{rrrr} 96 & 97 & 39 & 88 \\ \underline{27} & \underline{26} & \underline{18} & \underline{49} \end{array}$

Find the product of:

22. $\begin{array}{rrrr} 23 & 14 & 15 & 16 \\ \underline{2} & \underline{5} & \underline{4} & \underline{5} \end{array}$ **23.** $\begin{array}{rrrr} 28 & 17 & 18 & 27 \\ \underline{2} & \underline{5} & \underline{5} & \underline{3} \end{array}$

24. $\begin{array}{rrrr} 13 & 14 & 15 & 16 \\ \underline{7} & \underline{6} & \underline{6} & \underline{6} \end{array}$

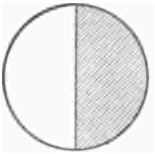
Find the quotient of:

25. 6)96 6)90 6)72 6)80

26. 5)80 5)90 5)85 5)95

27. 4)92 4)88 4)76 4)72

CXXXV.—HALVES, FOURTHS, SIXTHS, EIGHTHS, REVIEW



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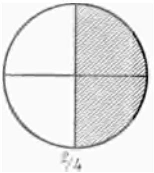

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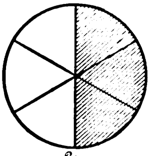

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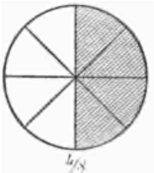


4/8

1. The first circle is divided into ——. (Halves.) (Draw the circles and divide them as shown.)

2. The second circle is divided into ——.

3. The third circle is divided into ——.

4. The fourth circle is divided into ——.

5. $\frac{1}{2}$ is equal to —— fourths.

6. $\frac{1}{2}$ is equal to —— sixths.

7. $\frac{1}{2}$ is equal to —— eighths.

8. $\frac{1}{2} = \frac{}{4} = \frac{}{6} = \frac{}{8}$.

9. If $\frac{1}{2}$ is worth 24¢, what is $\frac{1}{4}$ worth? What is $\frac{1}{6}$ worth? What is $\frac{1}{8}$ worth?

10. If $\frac{1}{8}$ weighs 2 pounds, what does $\frac{1}{2}$ weigh? What does $\frac{1}{4}$ weigh?

11. How many eighths in one fourth?

12. How many sixths in one half?

13. Show by lines that $\frac{1}{2}$, $\frac{2}{4}$, and $\frac{4}{8}$ are equal.

Find sums at sight:

14.	15.	16.	17.	18.	19.
2	2	3	2	3	4
1	2	3	1	2	4
2	3	1	3	3	1
2	3	1	3	2	2
3	1	2	3	3	2
1	1	3	2	2	2
3		2	2	4	1

Find differences at sight:

20.					21.				
39	27	18	16	12	17	16	14	17	18
2	3	5	7	5	5	5	5	6	6

22.					23.				
44	34	25	39	26	21	22	23	24	19
5	5	4	4	4	3	4	5	6	7

Find products at sight:

24.	30	21	23	24	23	**25.**	13	14	15	20	21
	3	3	3	2	2		2	2	2	2	2
26.	13	12	14	33	31	**27.**	33	32	34	30	31
	3	3	3	2	2		3	3	2	2	3

Find quotients at sight:

28. 2)22 2)24 2)26 2)28 2)30

29. 3)21 3)27 3)39 3)60 3)63

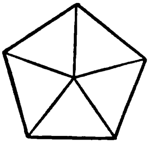
30. 3)66 3)69 3)90 3)96 3)93

31. 3)99 2)42 2)46 2)64 2)66

32. 4)84 4)92 4)52 4)56 4)96

33. 5)25 5)65 5)55 5)50 5)60

CXXXVI.—PENTAGON, FIFTHS AND TENTHS



1. This figure has —— sides. It is a pentagon.

2. It is divided into —— equal parts. (Draw a pentagon and divide it as shown.)

3. Each of these parts has —— sides. Each part is a ——.

4. Each part is —— —— of the pentagon.

5. If we call the pentagon 5, what shall we call each triangle?

6. If the pentagon is worth 15 cents, what is each part worth?

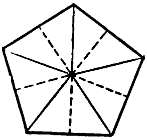
7. What are $\frac{2}{5}$ of the pentagon worth?

8. What are $\frac{3}{5}$ of the pentagon worth?

9. What are $\frac{4}{5}$ of the pentagon worth?

10. If each part is 6 square inches, how large is the whole pentagon?

11. How many square inches in $\frac{2}{5}$ of the pentagon? In $\frac{3}{5}$? In $\frac{4}{5}$?



12. This pentagon is divided into —— equal parts.

13. Each triangle is —— —— of the pentagon.

14. If the pentagon is worth 20¢, what is each triangle worth?

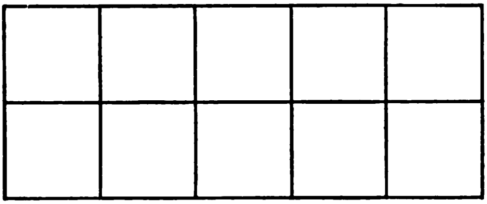
15. If we call the pentagon 30, what shall we call each triangle?

16. Each triangle is —— —— of 30; 2 triangles are 2 —— of 30.

17. How many 2-triangles in all? 2 triangles are —— —— of the pentagon.

18. —— tenths equal —— fifth.

19. How many 2-squares in this rectangle? 2 squares are —— —— of the rectangle.



20. Each square is —— —— of the rectangle. $\frac{1}{2}$ of one fifth is —— ——.

21. If one fifth is 6 square inches, 1 tenth is —— square inches.

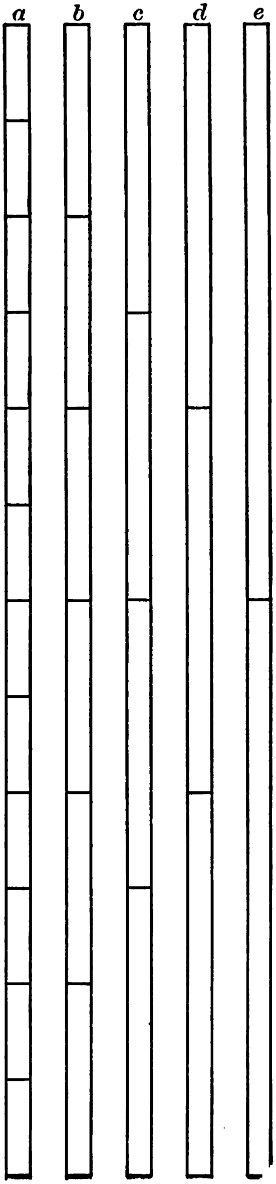
22. If 1 tenth is worth 7 dollars, 1 fifth is worth —— dollars.

CXXXVII. — HALVES, FOURTHS, SIXTHS, AND TWELFTHS

1. *a* is divided into —— —— equal parts. Each part is —— —— of *a*.

2. *b* is divided into —— equal parts, into —— equal parts, and also into —— equal parts. These parts are called —— and —— and ——.

3. *c* is divided into —— equal parts and also into —— equal parts. These parts are called —— and ——.



4. *d* is divided into ——.

5. *e* is divided into ——.

6. Four of the five lines are divided into ——.

7. One half is equal to —— twelfths.

8. One third is equal to —— twelfths.

9. One fourth is equal to —— twelfths.

10. One sixth is equal to —— twelfths.

11. These lines are —— inches long. Draw them and divide them as shown.

12. One half equals —— fourths.

13. One half equals —— sixths.

14. One third equals —— sixths.

15. One third and one fourth are equal to —— twelfths.

16. One fourth and one sixth are equal to —— twelfths.

17. One third less one fourth is equal to —— twelfths.

18. One fourth less one sixth is equal to —— twelfths.

19. One half and one twelfth are equal to —— twelfths.

20. One third and one twelfth are equal to —— twelfths.

21. One fourth and one twelfth are equal to —— twelfths.

22. One sixth and one twelfth are equal to —— twelfths.

23. 1 half less 1 twelfth is equal to —— twelfths.

24. 1 third less 1 twelfth is equal to —— twelfths.

25. 1 fourth less 1 twelfth is equal to —— twelfths.

26. 1 sixth less 1 twelfth is equal to —— twelfth.

27. 2 thirds equal —— twelfths.

28. 2 fourths equal —— twelfths.

29. 3 fourths equal —— twelfths.

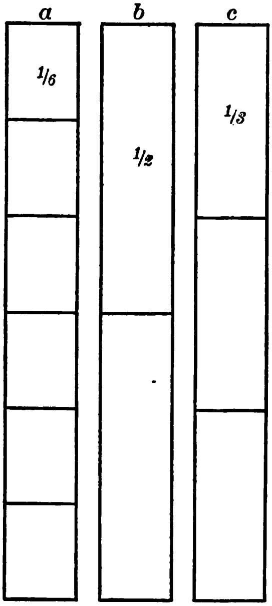
30. 2 sixths equal —— twelfths.

31. 3 sixths equal —— twelfths.

CXXXVIII.—HALVES, THIRDS, AND SIXTHS

1. Which is larger, $\frac{1}{2}$ of an apple or $\frac{1}{4}$ of an apple?

2. In $\frac{1}{2}$ of an apple there are —— fourths. How much larger is one half than one fourth?



3. *a* is divided into ——.

4. *b* is divided into ——.

5. *c* is divided into ——.

6. Draw these rectangles and divide them as shown.

7. 1 half is equal to —— sixths.

8. 1 third is equal to —— sixths.

9. 1 half and 1 third are equal to —— sixths.

10. 1 half less 1 third is equal to —— sixth.

11. If one sixth is worth 4 cents, 1 third is worth —— cents.

12. $\frac{1}{2}$ is worth —— cents, and 1 is worth —— cents.

13. $\frac{1}{2}$ is —— sixth larger than $\frac{1}{3}$.

14. $\frac{1}{2}$ is —— sixths larger than $\frac{1}{6}$.

15. In 1 half there are —— sixths.

16. In 1 third there are —— sixths.

17. Which is larger, $\frac{1}{3}$ of an apple or $\frac{1}{6}$ of an apple?

Add:

18.	21	27	32	**19.**	15	16	17	**20.**	18	19	32
	32	23	24		15	16	17		18	19	32

Subtract:

21.	43	45	48	**22.**	50	51	52	**23.**	38	48	58
	14	15	16		29	21	31		24	34	34

Multiply:

24.	41	42	43	**25.**	21	31	31	**26.**	35	36	37
	2	2	2		3	3	2		2	2	2

Divide:

27. $\frac{1}{3} \div 2$. ($\frac{1}{2}$ of a third.)

28. $\frac{1}{6} \div 2$. ($\frac{1}{2}$ of a sixth.)

29. $18 \div 2$.

30. $38 \div 2$.

31. $78 \div 2$.

32. $98 \div 2$.

33. $\frac{1}{4} \div 2$.

34. $26 \div 2$.

35. $\frac{1}{2} \div 3$.

36. $27 \div 2$.

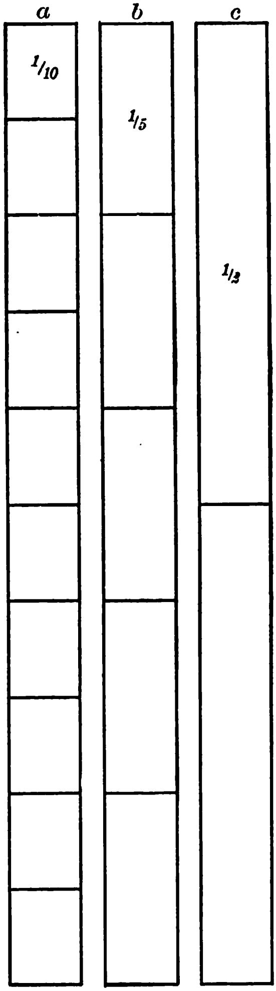
37. $\frac{1}{2} \div 2$.

38. $28 \div 2$.

39. $18 \div 2$.

40. $19 \div 2$.

CXXXIX. — HALVES, FIFTHS, AND TENTHS, DRILL



1. *c* is divided into ——.
2. *b* is divided into ——.
3. *a* is divided into ——.
4. Draw these rectangles and divide them as shown.
5. 1 half is equal to —— tenths.
6. 1 fifth is equal to —— tenths.
7. 1 half and 1 fifth are equal to —— tenths.
8. 1 half less 1 fifth is equal to —— tenths.
9. $\frac{1}{2}$ of a fifth is a ——.
10. If $\frac{1}{2}$ is worth 10 cents, $\frac{1}{10}$ is worth —— cents.
11. $\frac{1}{5}$ is worth —— cents.
12. $\frac{2}{5}$ are worth —— cents.
13. $\frac{3}{5}$ are worth —— cents.
14. 2 times $\frac{1}{10}$ are equal to —— ——, or —— fifth.
15. 4 times $\frac{1}{10}$ are equal to —— ——, or —— fifths.

16. $\frac{1}{10}$ is contained in $\frac{1}{5}$ —— times.
17. $\frac{1}{10}$ is contained in $\frac{2}{5}$ —— times.
18. $\frac{1}{2}$ is —— tenths more than $\frac{1}{10}$.
19. $\frac{1}{5}$ is —— tenth more than $\frac{1}{10}$.
20. $\frac{1}{10}$ is contained in $\frac{1}{2}$ —— times.
21. $\frac{1}{5} \div 2$. 22. $\frac{1}{2} \div 5$.
23. $\frac{1}{5} + \frac{1}{10}$. 24. $\frac{1}{5} - \frac{1}{10}$.
25. $\frac{1}{2} + \frac{1}{5}$. 26. $\frac{1}{2} - \frac{1}{5}$.
27. $\frac{1}{2} + \frac{3}{10}$. 28. $\frac{1}{2} - \frac{3}{10}$.
29. $\frac{1}{5} + \frac{3}{10}$. 30. $\frac{3}{10} - \frac{1}{5}$.

31. For rapid drill in addition and subtraction. As the outer numbers are designated by the teacher or a pupil, require the pupils, one at a time, to quickly give the sum (or difference) of the central number and each outer number. By changing the central number from time to time, all of the numbers from 1 to 12 may be used. This device or another equivalent to it should be drawn and used on the blackboard. Do not continue till the children are tired. *Frequent* drills not *long* ones, will ensure rapidity and accuracy.

1	*6*	*12*	*2*
10	*8*		*7*
5			*11*
4	*9*	*8*	*3*

CXL.

	Add:	Subtract:			Multiply:	Divide:
1.	5 8	13 5	13 8	11.	22 2	2)44
2.	7 6	13 7	13 6	12.	22 3	3)66
3.	13 5	18 13	18 5	13.	22 4	4)88
4.	16 5	21 5	21 16	14.	21 2	2)42
5.	14 7	21 7	21 14	15.	21 3	3)63
6.	6 8	14 6	14 8	16.	21 4	4)84
7.	7 9	16 7	16 9	17.	23 3	3)69
8.	16 4	20 16	20 4	18.	23 4	4)92
9.	15 6	21 6	21 15	19.	24 3	3)72
10.	8 7	15 8	15 7	20.	25 3	3)75

21. One 2 is ——.
Two 2's are ——.
Four 2's are ——.
Six 2's are ——.
Three 2's are ——.
Five 2's are ——.
Ten 2's are ——.
Twelve 2's are ——.
Seven 2's are ——.
Nine 2's are ——.
Eleven 2's are ——.
Eight 2's are ——.

22. One 3 is ——.
Two 3's are ——.
Four 3's are ——.
Six 3's are ——.
Three 3's are ——.
Five 3's are ——.
Ten 3's are ——.
Twelve 3's are ——.
Seven 3's are ——.
Nine 3's are ——.
Eleven 3's are ——.
Eight 3's are ——.

23. One 4 is ——.
Two 4's are ——.
Four 4's are ——.
Six 4's are ——.
Three 4's are ——.
Five 4's are ——.
Seven 4's are ——.
Nine 4's are ——.

24. One 5 is ——.
Two 5's are ——.
Four 5's are ——.
Six 5's are ——.
Three 5's are ——.
Five 5's are ——.
Seven 5's are ——.

Try to read in 10 seconds:

25. $7 + 4 =$ ——.
26. $8 + 5 =$ ——.
27. $6 + 5 =$ ——.
28. $7 + 8 =$ ——.
29. $7 + 5 =$ ——.
30. $9 + 5 =$ ——.
31. $8 + 5 =$ ——.
32. $9 + 6 =$ ——.